HAYWARD UNIFIED SCHOOL DISTRICT

24411 Amador Street
Hayward, CA 94544
510.784.2600

BID PACKAGE

Bid No. 26.006

Tennyson HS Locker Rooms/Gym Floor Upgrades

BID DUE DATE AND TIME

HUSD Administration
Building 24411
Amador Street
Hayward, CA 94544
Bid Due – May 14, 2026 – 2:00 pm

QUATTROCCHI KWOK
ARCHITECTS

Project Manual

for the

SUMMER 2026 BID SCOPE

Tennyson High School

Building G Modernization

Construction Documents

June 5, 2025
April 15, 2026 BID SET 2026
DSA File Number: 1-H6
DSA Application Number: 01-122019
PTN Number: 61192-223

Owner:
Hayward Unified School District
24411 Amador Street
Hayward, CA 94544

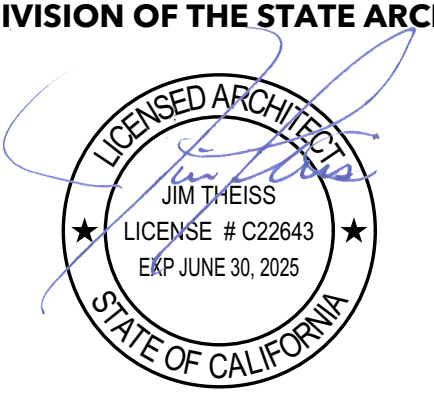
Architect:
Quattrocchi Kwok Architects
636 Fifth Street
Santa Rosa, CA 95404
P: 707.576.0829
F: 707.576.0295

Architect's Project No.: 1910.00

DOCUMENT 00 0107

PROFESSIONAL SEALS AND DSA IDENTIFICATION STAMP

DIVISION OF THE STATE ARCHITECT IDENTIFICATION STAMP



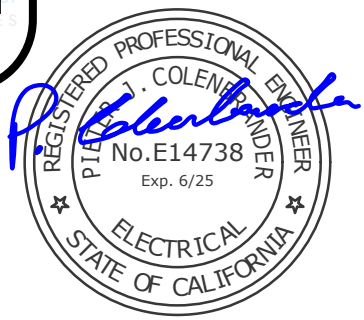
Date: 04/23/2025



Architect
QUATTROCCHI KWOK ARCHITECTS
636 Fifth Street
Santa Rosa, CA 95404
P: 707-576-0829
James Theiss
Lic: C22643

Structural Engineer
ZFA
1212 Fourth Street, Suite Z
Santa Rosa, CA 95404
P: 707-526-0992
Chris Warner
Lic: S4613

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 01-122019 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 6/24/2025





Electrical Engineer
O'MAHONY & MYER
4340 Redwood Hwy., Suite 245
San Rafael, CA 94903
P: 415-492-0420
Pieter Colenbrander
Lic: E14738

Mechanical Engineer
COSTA ENGINEERS
851 Napa Valley Corporate Way, Ste D
Napa, CA 94558
P: 707-252-9177
Chris Del Core
Lic: M31600

END OF SECTION

DOCUMENT 00 0110

TABLE OF CONTENTS

00 0101 COVER
00 0107 PROFESSIONAL SEALS AND DSA IDENTIFICATION STAMP
00 0110 TABLE OF CONTENTS

DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 DOCUMENTS PROVIDED BY THE OWNER: NOT REVIEWED BY DSA

TECHNICAL SPECIFICATIONS

DIVISION 01 - GENERAL REQUIREMENTS

01 1100 SUMMARY OF WORK
01 2100 ALLOWANCES
01 2200 MEASUREMENT AND PAYMENT
01 2300 ALTERNATES
01 2600 MODIFICATION PROCEDURES
01 2900 APPLICATIONS FOR PAYMENT
01 3200 CONSTRUCTION PROGRESS SCHEDULE
01 3300 SUBMITTALS
01 3543 SPECIAL PROJECT PROCEDURES – HAZARDOUS MATERIAL ABATEMENT
01 3543.01 HAZARDOUS MATERIAL ABATEMENT SURVEY SUMMARY REPORT
01 3543.02 HAZARDOUS MATERIAL ABATEMENT SPECIFICATIONS
01 3900 COORDINATION AND MEETINGS
01 4000 QUALITY CONTROL
01 4200 REFERENCE STANDARDS
01 4500.01 STRUCTURAL TESTS & SPECIAL INSPECTIONS
01 4523 TESTING AND INSPECTION SERVICES
01 5000 TEMPORARY FACILITIES
01 5600 TEMPORARY CONTROLS
01 6000 PRODUCT REQUIREMENTS
01 6116 VOLATILE ORGANIC COMPOUND (VOC) RESTRICTIONS
01 6116.01 ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM
01 7000 CONTRACT CLOSEOUT
01 7419 CONSTRUCTION WASTE MANAGEMENT
01 7500 STARTING OF SYSTEMS
01 7513 EXECUTION REQUIREMENTS
01 8113 SUSTAINABLE DESIGN REQUIREMENTS

DIVISION 02 – EXISTING CONDITIONS

02 4119 MINOR DEMOLITION FOR REMODELING

DIVISION 03 – CONCRETE

03 0100 MAINTENANCE OF CONCRETE
03 3000 CAST-IN-PLACE CONCRETE

DIVISION 04 – MASONRY

NOT USED

DIVISION 05 – METALS

05 5000 METAL FABRICATIONS

DIVISION 06 – WOOD, PLASTICS AND COMPOSITES

06 1000 ROUGH CARPENTRY
06 2000 FINISH CARPENTRY
06 4100 ARCHITECTURAL WOOD CASEWORK

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 0150 TPO ROOFING REPAIR
07 2100 BOARD AND BATT [BUILDING] INSULATION
07 9200 JOINT SEALANTS

DIVISION 08 – OPENINGS

08 1113 HOLLOW METAL DOORS AND FRAMES
08 1416 FLUSH WOOD DOORS
08 7100 DOOR HARDWARE
08 8000 GLAZING
08 8300 MIRRORS

DIVISION 09 – FINISHES

09 0511 CONCRETE FLOOR PREPARATION
09 0512 CONCRETE FLOOR MOISTURE CONTENT AND PH TESTING
09 0561 COMMON WORK RESULTS FOR FLOORING PREPARATION
09 2116 GYPSUM BOARD ASSEMBLIES
09 2400 CEMENT PLASTERING
09 3000 TILING
09 5153 DIRECT-APPLIED ACOUSTICAL CEILINGS
~~09 6466 WOOD ATHLETIC FLOORING~~
~~09 6500 RESILIENT FLOORING~~
09 6700 FLUID APPLIED FLOORING
~~09 6813 TILE CARPETING~~
09 9123 INTERIOR PAINTING

DIVISION 10 - SPECIALTIES

10 1400 SIGNAGE
10 2113.19 PLASTIC TOILET COMPARTMENTS

10 2800 TOILET ACCESSORIES
10 4400 FIRE PROTECTION SPECIALTIES
10 5113 METAL LOCKERS
10 8223 NOT USED

DIVISION 11 - EQUIPMENT

NOT USED

DIVISION 12 - FURNISHINGS

~~12 3600 COUNTERTOPS~~

DIVISION 13 – SPECIAL CONSTRUCTION

NOT USED

DIVISION 14 - CONVEYING EQUIPMENT

NOT USED

DIVISION 15 THROUGH DIVISION 20

NOT USED

DIVISION 21 – FIRE SUPPRESSION

NOT USED

DIVISION 22 – PLUMBING

22 0000 PLUMBING

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING (HVAC)

23 0000 HEATING, VENTILATING, AIR CONDITIONING
23 0500 GENERAL MECHANICAL
23 0593 TESTING, ADJUSTING, AND BALANCING FOR HVAC
23 0900 CONTROLS FOR HVAC

DIVISION 25 – INTEGRATED AUTOMATION

NOT USED

DIVISION 26 – ELECTRICAL

26 0500 BASIC ELECTRICAL REQUIREMENTS
26 0800 TESTING
26 2400 SERVICE AND DISTRIBUTION SYSTEM
26 2700 BASIC ELECTRICAL MATERIALS AND METHODS
26 5101 LIGHTING
26 5700 LOW VOLTAGE LIGHTING CONTROL SYSTEM

DIVISION 27 – COMMUNICATIONS

27 0000 TELECOMMUNICATIONS SYSTEM

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 3100 FIRE ALARM SYSTEM WITH VOICE EVACUATION

DIVISION 31- EARTHWORK

NOT USED

DIVISION 32- EXTERIOR IMPROVEMENTS

NOT USED

DIVISION 33 – UTILITIES

NOT USED

DIVISIONS 34 THROUGH 48

NOT USED

END OF TABLE OF CONTENTS

NOTICE TO BIDDERS

Notice is hereby given that the Hayward Unified School District (hereinafter referred to as "Owner") will receive sealed bids prior to the date and time stated for the bid opening for the award of a contract for **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades** located at 27035 Whitman Street, Hayward, CA 94544 (the "Contract"), as per the Contract Documents are available on the District's website at: https://www.husd.us/departments/business-services/bonds

The Owner reserves the right to add or deduct any of the additive or deductive items after the lowest responsible and responsive bidder is determined. The lowest bid shall be determined by **Base Bid Only** on the amount of the base bid.

This Contract is subject to prequalification. See Instructions to Bidders for details.

This Contract is subject to the District's Project Labor Agreement (see ***Construction Project Stabilizations Agreement*** on the District website).

The Director of Industrial Relations of the State of California, in the manner provided by law, has ascertained the general prevailing rate of per diem wages and rate for legal holidays and overtime work. The Contractor must pay for any labor therein described or classified in an amount not less than the rates specified. Copies of the required rates are on file at the Owner's business office and are available on request.

Public works projects shall be subject to compliance monitoring and enforcement by the Department of Industrial Relations. For all projects over Twenty-Five Thousand Dollars ($25,000), a contractor or subcontractor shall not be qualified to submit a bid or to be listed in a bid proposal subject to the requirements of Public Contract Code section 4104 unless currently registered and qualified under Labor Code section 1725.5 to perform public work as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code. For all projects over Twenty-Five Thousand Dollars ($25,000), a contractor or subcontractor shall not be qualified to enter into, or engage in the performance of, any contract of public work (as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code) unless currently registered and qualified under Labor Code section 1725.5 to perform public work and proof of registration is provided.

For all projects over Twenty-Five Thousand Dollars ($25,000), the bidder shall state the public works contractor registration number on the Designation of Subcontractors form for each subcontractor performing more than one-half of one percent (0.5%) of the bidder's total bid.

The deadline for Completion is August 10, 2026. See Article III of the Agreement for details.

Bids must be submitted in a sealed envelope and marked on the exterior **Bid Enclosed**

#26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades, to the District Office - Purchasing Department at 24411 Amador Street, Hayward, CA 94544, on **May 14, 2026,** before **2:00 p.m.** on the clock designated by the Owner or its representative as the bid clock. No bid will be accepted by the Owner after this time. Facsimile (FAX) copies of the bid will not be accepted. Bids may be opened immediately after the above deadline for submittal, or at a later time, within the Owner's discretion.

Mandatory pre-bid site visit will be held on **Wednesday, April 29, 2026, at 3:30 p.m**., at 27035 Whitman Street, 94544. Bidders not attending the site visit will be disqualified.

All bidders' questions must be submitted in writing via email to facilitiesbond@husd.k12.ca.us no later than **2:00 p.m., Wednesday, May 6, 2026.**

The District may respond to questions presented via addenda to this Bid on the District's website at: https://www.husd.us/departments/business-services/bonds by **Friday, May 8, 2026,** at **2:00 p.m**. Bidders are responsible to consult the website up to 72 hours before the bid deadline to review and address any applicable addenda.

Bids must be accompanied by a bidder's bond, cashier's check, or certified check for at least ten percent (10%) of the amount of the base bid and made payable to the Owner, as detailed in the Contract Documents.

Pursuant to the Contract Documents, the successful bidder will be required to furnish a Payment (Labor and Material) Bond in the amount of one hundred percent (100%) of the Contract Sum, and a Faithful Performance Bond in the amount of one hundred percent (100%) of the Contract Sum.

The successful bidder will be allowed to substitute securities or establish an escrow in lieu of retainage, pursuant to Public Contract Code Section 22300, and as described in the Agreement Between Owner and Contractor and General Conditions.

The Owner will not consider or accept any bids from contractors who are not licensed to do business in the State of California, in accordance with the California Public Contract Code, providing for the licensing of contractors. In accordance with Section 3300 of said Code, the bidder shall have a Class "**B**" license at the time of award and shall maintain that license in good standing through Completion of the Contract and all applicable warranty periods.

INSTRUCTIONS TO BIDDERS

The **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrade**s,
located at 27035 Whitman St., Hayward, CA 94544, Contract for the
Hayward Unified School District

SECURING DOCUMENTS:

The Contract Documents, including the Drawings and Specifications, are available at https://www.husd.us/departments/business-services/bonds.

PREQUALIFICATION:

This Contract is subject to prequalification, which applies to contractors with the following licenses: Prime contractors with either an A or B license; and Contractors with a C-4, C-7, C-10, C- 16, C-20, C-34, C-36, C-38, C-42, C-43, or C-46 license, regardless of whether they are a prime contractor or subcontractor. If a bidder is not prequalified to bid on the Contract at least five (5) business days before the bid deadline, and at the bid deadline, Owner will not accept the bid. Any subcontractors listed by a bidder for Work requiring one of the above "C" licenses must be prequalified at least five (5) business days before the bid deadline and at the bid deadline, or Owner will not accept the bid. The application for prequalification must be submitted to the Owner by **Thursday, May 7, 2026.** The prequalification application may be obtained from the Owner. If a contractor is currently prequalified by the District in an amount sufficient for this contract, and such prequalification will not expire prior the bid deadline for this contract, then the contractor will not have to submit a new prequalification application.

RETENTION:

The Owner will withhold retention of 5% from all progress payments.

REGISTRATION:

For all projects over Twenty-Five Thousand Dollars ($25,000), the Owner shall not accept any bid or enter into any contract without proof of the bidder's current registration to perform public work under Labor Code section 1725.5. The bidder may meet this requirement by submitting a printout of its registration information from the DIR website.

For all projects over Twenty-Five Thousand Dollars ($25,000), the bidder shall not accept any subbid or enter into any subcontract without proof of the subcontractor's current registration to perform public work under Labor Code section 1725.5.

PRE-BID CONFERENCES, SITE VISITS, OR MEETINGS:

Mandatory pre-bid conferences and site visit will be held as described in the Notice to Bidders.

BUILDER'S RISK COVERAGE:

For the purpose of builder's risk coverage (see General Conditions Article 11), the project is being solely funded by revenue bonds.

PROJECT LABOR AGREEMENT:

This contract is subject to the District's Project Stabilization Agreement, dated November 5, 2025, which is available at https://www.husd.us/departments/business-services/bonds .

USE OF FEDERAL FUNDS:

No federal funds are being used by Owner for the Contract.

BIDS:

Bids to receive consideration shall be made in accordance with the following instructions:

1. Facsimile, e-mail, or other electronic copies of the Bid Form and other bid documents will not be accepted; only hard copies will be accepted. Bids shall be made on the Bid Form obtained from the Owner. Bids not made on the proper Bid Form shall be disregarded. Numbers must be stated in words and figures.

2. No bid will be considered which makes exceptions, changes, or in any manner makes reservations to the terms of the drawings or specifications. If prequalification is required for this Contract, no bid will be accepted from a contractor that has not been prequalified.

3. Questions regarding documents, discrepancies, omissions, or doubt as to meanings shall be referred immediately to the Construction Manager at facilitiesbond@husd.k12.ca.us who will send written instructions clarifying such questions in an addendum. Oral responses will not be binding on the Owner or Architect, or any Construction Manager.

4. Signatures:

    A. Each bid must give the full business address of the bidder and be signed by bidder. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by a general partner with authority to bind the partnership in such matters, followed by the signature and designation of the person signing. The name of the person signing shall also be typed or printed below the signature. Bids by corporations must be signed with the legal name of

the corporation, followed by the name of the state of incorporation and by the signature and designation of the chairman of the board, president or any vice president, and then followed by a second signature by the secretary, assistant secretary, the chief financial officer or assistant treasurer. All persons signing must be authorized to bind the corporation in the matter. The name of each person signing shall also be typed or printed below the signature. Satisfactory evidence of the authority of the officers signing on behalf of a corporation shall be furnished with the bid.

B. The signatures on the Bid Form and other bid documents must be original longhand signatures in permanent blue ink. Any other type of signature, including an electronic signature, will not be accepted.

5. Pursuant to the provisions of Sections 4100 to 4114, inclusive, of the Public Contract Code of the State of California, which are hereby incorporated and made a part hereof and these Instructions to Bidders, every bidder shall set forth in its bid (using the Owner's form for Designation of Subcontractors):

A. The name and location of the place of business, the California contractor license number, and (for all projects over Twenty-Five Thousand Dollars ($25,000)) the public works contractor registration number, of each subcontractor who will perform work or labor or render service to the bidder in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the bidder, specially fabricates and installs a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half (½) of one percent (1%) of the bidder's total bid. An inadvertent error in listing a California contractor's license number shall not be grounds for filing a bid protest or for considering the bid nonresponsive if the bidder submits the corrected contractor's license number to the Owner within 24 hours after the bid opening, or any continuation thereof, so long as the corrected contractor's license number corresponds to the submitted name and location for that subcontractor.

B. The portion of the Work which will be done by each such subcontractor. If the bidder fails to specify a subcontractor for any portion of the Work to be performed under the Contract in excess of one-half (½) of one percent (1%) of the bidder's total bid, the bidder agrees to perform that portion itself. The successful bidder shall not, without the consent of the Owner:

1) Substitute any person as subcontractor in place of the subcontractor designated in the original bid.

2) Permit any subcontract to be assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the bid.

3) Sublet or subcontract any portion of the Work in excess of one-half (½) of one percent (1%) of the total bid as to which the original bid did not designate a subcontractor.

6. The Director of Industrial Relations of the State of California, in the manner provided by law, has ascertained the general prevailing rate of per diem wages and the rate for legal holidays and overtime work. The Contractor must pay for any labor therein described or classified in an amount not less than the rates specified. Copies of the required rates are on file at the Owner's business office and are available to any interested party on request.

7. All Bid Forms must be accompanied by a completed Noncollusion Declaration and Sufficient Funds Declaration (Labor Code § 2810). All bids must be accompanied by an executed Fingerprinting Notice and Acknowledgment, Iran Contracting Act certification (if required by law; see the form), Workers' Compensation certification, responses to the Contractor Questionnaire (if required; see Paragraph 13, below), and the DVBE Certification of Participation and the DVBE Good Faith Worksheet (if DVBE is required; see Paragraph 10, below).

8. Bids must be accompanied by a certified check, cashier's check, cash, or bidder's bond, for an amount not less than ten percent (10%) of the amount of the base bid, made payable to the order of the Owner. If a bidder's bond accompanies the bid, said bond shall be in the form provided by the Owner, and shall be secured by an Admitted Surety (an insurance organization authorized by the Insurance Commissioner to transact business of insurance in the State of California during this calendar year). The surety insurer must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bond, have a rating not lower than "A-" as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurer selected by Contractor and to require Contractor to obtain a bond from a surety insurer satisfactory to the Owner. Said check or bond shall be given as a guarantee that the bidder will enter into the Contract if awarded the Work, and in case of refusal or failure to enter into said Contract, the check or bond, as the case may be, shall be payable to the Owner and retained as liquidated damages.

9. Bids shall be sealed and filed as indicated in the Notice to Bidders. Irrespective of how a bidder chooses to deliver the bid and other documents to the Owner, the bidder is responsible for ensuring that the bid and other documents are actually received at the location designated in the Contract Documents for receipt of the bid and other documents prior to the time for the bid opening. Bids and other documents for any

reason not actually received at the designated location prior to the time for the bid opening shall not be opened or considered.

10. **THIS CONTRACT IS SUBJECT TO THE DVBE REQUIREMENTS OF EDUCATION CODE SECTION 17076.11.** If this contract is subject to these requirements, then (a) the DVBE Certification must be submitted with the bid, and (b) the DVBE Worksheet must be submitted with the bid if Box D is checked on the first page of the DVBE Certification.

11. Contractors shall maintain their licenses in good standing through Completion of the Work and all applicable warranty periods. Owner shall reject any bid as nonresponsive if bidder or any subcontractor is not licensed in good standing from the time the bid is submitted to Owner up to award of the Contract, whether or not the bidder listed the subcontractor inadvertently, or if a listed subcontractor's license is suspended or expires prior to award of the Contract. Owner also reserves the right to reject any bid as nonresponsive if a listed subcontractor's license is not in good standing to perform the work for which it is listed from the time of submission of the bidder's bid to award of the Contract.

12. The Owner reserves the right to waive any irregularity or failure to comply with the Contract Documents, and to reject any or all bids.

13. No responses to a Contractor Questionnaire are required to be submitted with a bid on this Contract. Prequalification https://www.qualitybidders.com/

14. To summarize, each bid for the Contract must include the following documents:
    A. Bid form, including proof of signers' authority.
    B. Bid security.
    C. Designation of Subcontractors.
    D. Noncollusion Declaration.
    E. Sufficient Funds Declaration.
    F. Fingerprinting Notice and Acknowledgement.
    G. Workers' Compensation Certification.
    H. Iran Contracting Act Certification (if required by law; see the form).
    I. DVBE Certification (if required; see above).
    J. DVBE Worksheet (if required; see above).
    K. Proof of registration per Labor Code §1725.5 (see above).

WITHDRAWAL OF BIDS:

Bids may be withdrawn by bidders prior to the time fixed for the submittal of bids or any authorized postponement thereof.

A successful bidder shall not be relieved of the bid unless by consent of the Owner or bidder's recourse to Public Contract Code §5100 et seq.

Unless otherwise required by law, no bidder may withdraw its bid for a period of ninety (90) days after the date set for the opening thereof or any extension thereof. The Owner reserves the right to take more than ninety (90) days to make a decision regarding the rejection of the bid or the award of the Contract.

OPENING OF BIDS:

Opening of bids in public shall be at Owner's discretion, as set forth in the Notice to Bidders.

EXAMINATION OF CONTRACT DOCUMENTS AND SITE:

Before submitting a bid, bidders shall examine the drawings, read the specifications, the form of Agreement between Contractor and Owner, and the other Contract Documents. Bidders shall visit the site of the proposed Work, examine the building, or buildings, if any, and any work that may have been done thereon. Bidders shall fully inform themselves of all conditions, in, at, and about the site, the building or buildings, if any, and any work that may have been done thereon.

Pursuant to Public Contract Code section 1104, (1) bidders shall not be required to assume responsibility for the completeness and accuracy of architectural or engineering plans and specifications, except on clearly designated design build projects; (2) however, bidders shall be required to review architectural or engineering plans and specifications prior to submission of their bids and to report any errors and omissions to the Architect and Owner; and (3) the review shall be confined to the bidder's capacity as a bidder and not as a licensed design professional.

BID PROTESTS:

All bid protests must comply with the following, or they shall be rejected as invalid:

1. The protest shall be in writing;
2. The protest shall be filed and received no later than 4:00 p.m. on the third (3rd) business day after the deadline for submittal of the bids;
3. The protest shall set forth in detail all grounds for the protest, including all facts, supporting documentation, legal authorities and arguments in support of the bid protest;
4. Before the bid protest deadline, the protesting party shall transmit the complete bid protest, including all documentation, to all other parties having a potential interest that may be adversely affected by the outcome of the protest, including but not limited to all other bidders who may have a reasonable prospect of losing or obtaining an award of the Contract depending on the outcome of the protest; and
5. All factual contentions must be supported by competent, admissible and credible evidence.

The procedures and time limits set forth in this section for bid protests are strictly construed and are protesting party's sole and exclusive remedy in the event of a bid protest. Protesting

party's failure to strictly comply with these procedures and time limits shall constitute a waiver of any right to further pursue the bid protest, including but not limited to the presentation of a Government Code claim or legal proceedings. Any matter not set forth in the protest, including any ground for the protest or any evidence supporting a ground for the protest, shall be deemed waived.

A protesting party may not rely on the bid protest submitted by another protesting party, but must timely pursue its own bid protest.

Owner shall review a bid protest that was not rejected for failing to comply with the above procedures. Any final decision on such a bid protest shall be made by the Governing Board.

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

The form of Agreement between Owner and Contractor which the successful bidder will be required to execute, if awarded the Work, is a part of this Bid Package.

ADDENDA OR BULLETINS:

Any addenda or bulletins, issued during the time of bidding, shall form a part of the drawings and specifications loaned to the bidder for the preparation of its bid, shall be covered in the bid, and shall be made a part of the Contract Documents. All addenda or bulletins shall be signed by the Architect and approved by the Division of State Architect.

EVIDENCE OF RESPONSIBILITY:

Upon the request of Owner, a bidder shall submit promptly to the Owner or its designee satisfactory evidence showing the bidder's financial resources, the bidder's experience in the type of work required by the Owner, the bidder's organization available for the performance of the Contract, and any other required evidence of the bidder's or its subcontractor's qualifications to perform the proposed Contract. The Owner may consider such evidence before making its decision awarding the proposed Contract. Failure to submit evidence of the bidder's or its subcontractors' responsibility to perform the proposed Contract may result in rejection of the bid.

AWARD OF CONTRACT:

Rejection of any or all bids, contracting work with whomever and in whatever manner, abandoning work entirely, and/or waiving any informality in receiving of bids are reserved as the rights of the Owner.

Before the Contract is awarded, the Contractor receiving the award shall submit the CARB Compliance Declaration, including all certificates, to the Owner.

Before the Contract is awarded, the Owner may, at its sole discretion, require from a potential Contractor on the Contract further evidence of the reasonable qualifications of such contractor to faithfully, capably, and reasonably perform the Contract and may consider such evidence before making its decision on the award of the Contract.

If awarded, the Contract shall be awarded to the lowest responsible and responsive bidder as indicated in the Notice to Bidders and as interpreted by the Owner under California law and as specified herein. Owner reserves the right, without any liability, to cancel the award of the Contract for any reason at any time before the full execution of the Agreement between Owner and Contractor.

EXECUTION OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

Contractor shall sign and return the Agreement within ten (10) days after mailing, faxing or delivery of the Notice of Award of Contract, or prior to the commencement of the Work, whichever is earlier. The Contractor shall sign the Agreement in as many originals as the Owner deems necessary. Within ten (10) days after mailing, faxing, or delivery of the Notice of Award of Contract, or prior to the commencement of the Work, whichever is earlier, the Contractor shall also submit to Owner the Contract payment and performance bonds; insurance certificates, additional insured endorsement, and declarations page; a Public Contract Code section 3006(a) the Drug-Free Workplace Certification; the Student Contact Form (see Attachment B to the Fingerprinting Notice and Acknowledgement); a schedule of values (see General Conditions §9.2.1.A); a schedule of cash flow (see General Conditions §9.2.1.B); and subcontractor information (see General Conditions §9.2.1.D). Within two (2) weeks after award the Work, or prior to commencement of the Work, whichever is earlier, the Contractor shall also submit to Owner the certified baseline schedule (see General Conditions §3.9.1). If the Contractor does not comply with this paragraph, Owner may revoke and/or cancel the award to the Contractor, award the Contract to the next lowest bidder, and pursue the low bidder and bid bond for damages, or may otherwise proceed as allowed by law.

CONTRACT BONDS:

As required by the Contract Documents, two bonds, as itemized below and in the forms presented in these Contract Documents, shall be furnished by the Contractor. The surety insurers must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bond, have a rating not lower than “A-” as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurers selected by Contractor and to require Contractor to obtain bonds from surety insurers satisfactory to the Owner.

> **Performance Bond** in the amount of one hundred percent (100%) of the Contract Sum to insure Owner during construction, and for one year after Completion and during any warranty or guaranty period, against faulty or improper materials or workmanship and to assure Owner of full and prompt performance of the Contract.

Payment Bond (Labor and Material) in the amount of one hundred percent (100%) of the Contract Sum in accordance with the laws of the State of California to secure payment of any and all claims for labor and materials used or consumed in performance of this Contract.

PAYMENTS:

Payments to the Contractor on account of the Contract shall be made in accordance with the terms of the Contract Documents.

TAXES:

The Owner is generally exempt from payment of Federal Excise Tax on materials. The Owner will furnish exemption certificates to the Contractor to be used to obtain materials ordinarily subject to Federal Excise Tax without payment of the tax. Bidder shall deduct Federal Excise Taxes from their bid prices before submitting bids, so that such taxes will not be included in the Contract Sum.

EARLY TERMINATION:

Notwithstanding any provision herein to the contrary, if for any fiscal year of this Contract the governing body of the Owner fails to appropriate or allocate funds for future periodic payments under the Contract after exercising reasonable efforts to do so, the Owner may upon thirty (30) days' notice, order Work on the Contract to cease. The Owner will remain obligated to pay for the Work already performed but shall not be obligated to pay the balance remaining unpaid beyond the fiscal period for which funds have been appropriated or allocated and for which the Work has not been done.

TIME OF COMPLETION AND LIQUIDATED DAMAGES:

The Contract Time shall be Sixty (60) calendar days. See Article III of the Agreement for details.

Liquidated damages for delay in Completion of the Work within the Contract Time, or for delay in completion of a specified portion of the Work by a milestone deadline, will accrue and may be assessed as provided in the Contract Documents, including Article III of the Agreement and Article 8 of the General Conditions.

COVID-19: N/A

During the Work, the Contractor shall ensure that all Work, including but not limited to Work performed by Subcontractors, is performed in compliance with all applicable legal, contractual,

and local government requirements related to the novel coronavirus and COVID-19, including "social distancing," masks, and hygiene as may be ordered by the State or local authorities and as may be directed in the Contract Documents (see Specification section **N/A**. In addition, the Contractor and its Subcontractors shall **N/A** Each bidder must include in its bid all costs related to these requirements in effect at the time of bidding. If additional COVID-19 requirements are imposed after the bid and the Contractor believes that it is entitled to additional time or money, it must timely submit proper requests pursuant to the Contract Documents.

SANCTIONS IN RESPONSE TO RUSSIAN AGGRESSION:

The Owner requires Contractor to comply with the Governor's March 4, 2022, Executive Order N-6-22 ("Order") relating to any existing sanctions imposed by the United States government and the State of California in response to Russia's actions in Ukraine, including additional requirements for contracts of $5 million or more. Failure to comply may result in the termination of the Contract.

BID FORM

HAYWARD UNIFIED SCHOOL DISTRICT
2411 AMADOR STREET, HAYWARD, CALIFORNIA 94544

Dear Board Members:

The undersigned, doing business under the firm name of _____, hereby proposes and agrees to enter into a contract, with the Hayward Unified School District ("Owner"), to furnish any and all labor, materials, applicable taxes, equipment and services for the completion of Work as described hereinafter and in the Contract Documents as **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrade**s **(the "Contract").**

Bid Amount (Base Bid):

The undersigned proposes to furnish such labor, materials, applicable taxes, equipment and services for the amount of _____ Dollars ($_____).

Miscellaneous:

The low bid shall be determined as described in the Notice to Bidders.

The undersigned shall, within ten (10) days after the date of such mailing, faxing, or delivering of a Notice of Award or prior to the commencement of the Work, whichever is earlier, execute and deliver an agreement in the form of agreement present in these Contract Documents and give Performance and Payment Bonds in accordance with the Instructions to Bidders.

The undersigned declares that it has read and understands the Contract Documents, including but not limited to the Notice to Bidders, the Instructions to Bidders, the Agreement, the General Conditions, the Drawings, the Specifications, and any Special Conditions.

Check one of the following boxes:

- ☐ The undersigned bidder is prequalified with the Owner pursuant to Public Contract Code section 20111.6 to submit a bid in the above amount for this Contract.
- ☐ Prequalification pursuant to Public Contract Code section 20111.6 is not required for this Contract.

The undersigned hereby designates as the office to which such Notice of Award of Contract may be mailed, faxed, or delivered:

_____

_____

Our Public Liability and Property Damage Insurance is placed with:

_____

_____

Our Workers' Compensation Insurance is placed with:

_____

_____

Circular letters, bulletins, addenda, etc., bound with the specifications or issued during the time of bidding are included in the bid, and, in Completing the Contract, they are to become a part thereof.

The receipt of the following addenda to the specifications is acknowledged:

Addendum No. _____ Date _____	Addendum No. _____ Date _____
Addendum No. _____ Date _____	Addendum No. _____ Date _____
Addendum No. _____ Date _____	Addendum No. _____ Date _____

This bid may be withdrawn in writing at any time prior to the scheduled time for the opening of bids, including any authorized postponement thereof.

A bidder shall not submit this bid form unless the bidder's California contractor's license number appears clearly on it, the license expiration date and class are stated, and the bid form contains a statement that the representations made therein are made under penalty of perjury. Any bid submitted by a contractor who is not licensed pursuant to Business and Professions Code section 7028.15 shall be considered nonresponsive and shall be rejected. Any bid not containing the above information may be considered nonresponsive and may be rejected.

Proof of Bidder's registration per Labor Code §1725.5 must be submitted with this bid form.

NOTE: This bid form must give the full business address of the bidder and be signed by bidder with bidder's usual signature. *Partnerships* must furnish the full name of all partners and must be signed in the partnership name by a general partner with authority to bind the partnership in such matters, followed by the signature and designation of the person signing. Satisfactory evidence of the authority of the signing person to bind the partnership shall be furnished with the bid. The name of the person signing shall also be typed or printed below the signature. *Corporations* must sign with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the chairman of the board, president or

any vice president, and then followed by a second signature by the secretary, assistant secretary, the chief financial officer or assistant treasurer. All officers signing must be authorized to bind the corporation in the matter. Satisfactory evidence of the authority of the signing officers to bind the corporation shall be furnished with the bid. The name of each person signing shall also be typed or printed below the signature. The name of each officer signing shall also be typed or printed below the signature. *California LLCs* must sign with the legal name of the LLC. A bid from a member-managed LLC must be signed by a member. A bid from a manager-managed LLC must be signed by the manager. The person signing must be authorized to bind the LLC in the matter. Satisfactory evidence of the authority of the signing person to bind the LLC shall be furnished with the bid. The name of the person signing shall also be typed or printed below the signature.

The undersigned declares under penalty of perjury under the laws of the State of California that the information and representations in the undersigned's bid documents (including this Bid Form and all other documents provided with the bid) are true and correct.

Name of Company as Licensed in California: _____

Business Address: _____

Telephone Number: _____

California Contractor License No.: _____

Class and Expiration Date: _____

Public Works Contractor Registration No.: _____

State of Incorporation, if Applicable: _____

INDIVIDUAL:

_____ Dated: _____, 20__
_____ (*Name*)

PARTNERSHIP:

Evidence of authority to bind the partnership is attached.

_____ Dated: _____, 20__
_____ (*Name*)
General Partner

CORPORATION:

Evidence of authority to bind the corporation is attached.

_____ Dated: _____, 20__
_____ (*Name*)
_____ (Chairman, Pres., or Vice-Pres.)

_____ Dated: _____, 20__
_____ (*Name*)
_____ (Secretary, Asst. Secretary, CFO, or Asst. Treasurer)

LLC:

Evidence of authority to bind the LLC is attached.

_____ Dated: _____, 20__
_____ (*Name*)
_____ (*Title*)

DESIGNATION OF SUBCONTRACTORS

Each bidder shall set forth below the name and the location of the place of business of each subcontractor, and the California contractor license number and (for all projects over Twenty-Five Thousand Dollars ($25,000)) public works contractor registration number of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the Work or improvement, or to a subcontractor licensed by the State of California who, under subcontract to the Contractor, specially fabricates and installs a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent (0.5%) of the bidder's total bid, and the portion of the Work which will be done by each subcontractor. An inadvertent error in listing a California contractor's license number shall not be grounds for filing a bid protest or for considering the bid nonresponsive if the bidder submits the corrected contractor's license number to the Owner within 24 hours after the bid opening, or any continuation thereof, so long as the corrected contractor's license number corresponds to the submitted name and location for that subcontractor.

If the Contractor fails to specify a subcontractor for any portion of the Work to be performed under the Contract in excess of one-half of 1 percent (0.5%) of the Contractor's total bid, the Contractor shall be deemed to have agreed to perform such portion itself, and shall not be permitted to subcontract that portion of the Work except under the conditions hereinafter set forth.

Subletting or subcontracting of any portion of the Work as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the legislative body of the Owner.

For all projects over Twenty-Five Thousand Dollars ($25,000): For any bid proposal submitted, and for any contract for public work entered into, an inadvertent error in listing a subcontractor who is not registered under Labor Code section 1725.5 shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, provided that either: the subcontractor is registered prior to the bid opening; or the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5(a)(2)(E), if applicable, within 24 hours after the bid opening; or the subcontractor is replaced by another registered subcontractor under Public Contract Code section 4107. Failure of a listed subcontractor to be registered shall be grounds under Public Contract Code section 4107 for the Contractor, with the Owner's consent, to substitute a registered subcontractor for the unregistered subcontractor.

Failure to provide this information in a legible manner may result in the rejection of an otherwise acceptable bid.

NOTE: *Reproduce page two of this section for additional listings needed beyond the length of this form.*

Portion of Work (description)	**Portion of Work (dollar amount)**	**Name of Subcontractor & Phone No.**	**Location of Subcontractor**	**California Contractor License Number**	**Public Works Contractor Registration Number**

I am the authorized representative of the Bidder submitting this Designation of Subcontractors and I declare that each subcontractor listed holds a valid and current contractor license in good standing in California to perform the portion of work for which the subcontractor is listed.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____, 20___, at _____ [*city*],_____[*state*].

Signature: _____

Print Name: _____

Title: _____

BID BOND

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS that we the undersigned _____ as Principal and _____ as Surety, are hereby held and firmly bound unto the Hayward Unified School District ("Owner") in the sum of _____ Dollars ($_____) for payment of which sum, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Owner a certain bid, attached hereto and hereby made a part hereof, to enter into a Contract in writing for the construction of **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades** in strict accordance with Contract Documents.

NOW, THEREFORE,

a. If said bid shall be rejected, or, in the alternative;

b. If said bid shall be accepted and the Principal shall execute and deliver a contract in the form of agreement attached hereto and shall execute and deliver Performance and Payment Bonds in the forms attached hereto (all properly completed in accordance with said bid), and shall in all other respects perform the agreement created by the acceptance of said bid;

Then this obligation shall be void, otherwise the same shall remain in full force and effect, it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereunder shall be the amount of this obligation as herein stated.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract on the call for bids, or to the Work to be performed hereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said Contract or the call for bids, or to the Work, or to the specifications.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under several seals this ____ day of _____, _____, the name and corporate party being hereto affixed and these presents duly signed by its

undersigned representative, pursuant to authority of its governing body. In the presence of:

(Notary Seal)

_____

(Principal)

_____

(Business Address)

_____

_____

(Corporate Surety)

_____

Business Address)

By:_____

_____

The rate or premium of this bond is _____ per thousand, the total amount of premium charged, $_____.

(The above must be filled in by Corporate Surety).

NONCOLLUSION DECLARATION

Owner: Hayward Unified School District
Contract: Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades
Site: Tennyson High School

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid or proposal ("Bid").

The Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The Bid is genuine and not collusive or sham. The bidder or proposer ("Bidder") has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid. The Bidder has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham Bid, or to refrain from bidding or proposing ("Bidding"). The Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the Bid price, or of that of any other Bidder. All statements contained in the Bid are true. The Bidder has not, directly or indirectly, submitted his or her Bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, Bid depository, or to any member or agent thereof to effectuate a collusive or sham Bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a Bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the Bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____, 20__, at _____ [*city*], _____ [*state*].

_____
Signature

_____
Print Name

IRAN CONTRACTING ACT CERTIFICATION
(Public Contract Code sections 2202-2208)
(To be Executed by Bidder and Submitted With Bid)

As required by Public Contract Code ("PCC") section 2204 for contracts of $1,000,000 or more, please insert bidder's or financial institution's name and Federal ID Number (if available) and complete **one** of the options below. Please note that California law establishes penalties for providing false certifications, including civil penalties equal to the greater of $250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to bid on contracts. (PCC §2205.)

OPTION #1 - CERTIFICATION

I, the official named below, certify I am duly authorized to execute this certification on behalf of the bidder/financial institution identified below, and the bidder/financial institution identified below is **not** on the current list of persons engaged in investment activities in Iran created by California Department of General Services ("DGS") and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person/bidder, for 45 days or more, if that other person/bidder will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS. (PCC §2204(a).)

Bidder Name/Financial Institution (Printed)	*Federal ID Number (or n/a)*
By (Authorized Signature)	
Printed Name and Title of Person Signing	
Date Executed	*Executed in*

OPTION #2 – EXEMPTION

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a bidder/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a proposal for, or enters into or renews, a contract for goods and services. If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

Bidder Name/Financial Institution (Printed)	*Federal ID Number (or n/a)*
By (Authorized Signature)	
Printed Name and Title of Person Signing	*Date Executed*

AGREEMENT BETWEEN OWNER AND CONTRACTOR

This Agreement, effective _____, 2026, is by and between the Hayward Unified School District, in Alameda County, California, hereinafter called the "Owner," and _____ hereinafter called the "Contractor."

WITNESSETH: That the Contractor and the Owner for the consideration hereinafter named agree as follows:

ARTICLE I. SCOPE OF WORK.

The Contractor agrees to furnish all labor, equipment and materials, including tools, implements, and appliances required, and to perform all the work required, by the Contract (the "Work") in a good and workmanlike manner, free from any and all liens and claims from mechanics, material suppliers, subcontractors, artisans, machinists, teamsters, freight carriers, and laborers, and as specified in

the **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades**

all in strict compliance with the plans, drawings and specifications therefore prepared by

Quattrocchi Kwok Architects

and other Contract Documents relating thereto.

The Contract as awarded includes the base scope of work only

During the Work, the Contractor shall ensure that all Work, including but not limited to Work performed by Subcontractors, is performed in compliance with all applicable legal, contractual, and local government requirements related to COVID-19 and other public health emergencies, including "social distancing," masks, and hygiene as may be ordered by the State or local authorities and as may be directed in the Contract Documents. In addition, the Contractor and its Subcontractors shall: none required at this time

This contract is subject to the District's Construction Project Stabilization Agreement, dated November 5, 2025, which is available at https://www.husd.us/departments/business-services/bonds/measureh2018-clone-clone

ARTICLE II. CONTRACT DOCUMENTS.

The Contractor and the Owner agree that all of the documents listed in Article 1.1.1 of the General Conditions are incorporated into this Agreement and form the "Contract Documents" which form the "Contract."

ARTICLE III. TIME TO COMPLETE AND LIQUIDATED DAMAGES.

Time is of the essence in this Contract. The Contractor shall commence the Work (including mobilization) on or after June 10, 2026, and shall Complete the Work on or before August 7, 2026 (this period of time being the "Contract Time")

The site for the Contract will not be available to the Contractor for construction on the following dates: **N/A.** The Contractor shall not be entitled to time extensions for lack of access to the site on these dates.

Failure to Complete the Work within the Contract Time and in the manner provided for by the Contract Documents, or failure to complete any specified portion of the Work by a milestone deadline, shall subject the Contractor to liquidated damages. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer if the Work were not Completed within the Contract Time, or if any specified portion of the Work were not completed by a milestone deadline, are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer in the event of such delay include, but are not limited to, loss of the use of the Work, disruption of activities, costs of administration and supervision, third party claims, and the incalculable inconvenience and loss suffered by the public.

Accordingly, the parties agree that $1,000_per calendar day of delay shall be the damages which the Owner shall directly incur upon failure of the Contractor to Complete the Work within the Contract Time or Complete any specified portion of the Work by a milestone deadline, as described above.

Liquidated damages will accrue for failure to meet milestone deadlines even if the Contractor Completes the Work within the Contract Time.

In addition, Contractor shall be subject to liquidated damages, or actual damages if liquidated damages are not recoverable under law, for causing another contractor on the Project to fail to timely complete its work under its contract or for causing delayed *completion* of the Project. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer if another contractor on the Project were to fail to timely complete its work under its contract or delay *completion* of the Project are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer in the event of such delay include, but are not limited to, loss of the use of the Work, loss of use of the other contractor's work, loss of use of the Project, disruption of activities, costs of administration and supervision, third party claims, the incalculable inconvenience and loss suffered by the public, and an Owner's inability to recover its delay damages from the contractors whose work was delayed by Contractor.

Accordingly, the parties agree that $1,000 for each calendar day of delay shall be the amount of damages which the Owner shall directly incur upon Contractor causing another contractor on the Project to fail to timely complete its work under its contract or causing delayed *completion* of the Project.

For Contractor's obligations regarding claims against Owner from other contractors on the Project alleging that Contractor caused delays to their work, see General Conditions sections 3.7.4, 3.16 and 6.2.3.

If liquidated damages accrue as described above, the Owner, in addition to all other remedies provided by law, shall have the right to assess the liquidated damages at any time, and to withhold liquidated damages (and any interest thereon) at any time from any and all retention or progress payments, which would otherwise be or become due the Contractor. In addition, if it is reasonably apparent to the Owner before liquidated damages begin to accrue that they will accrue, Owner may assess and withhold, from retention or progress payments, the estimated amount of liquidated damages that will accrue in the future. If the retained percentage or withheld progress payments are not sufficient to discharge all liabilities of the Contractor incurred under this Article, the Contractor and its sureties shall continue to remain liable to the Owner until all such liabilities are satisfied in full.

If Owner accepts any work or makes any payment under the Contract Documents after a default by reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any provision in the Contract Documents regarding time of Completion, milestone deadlines, or liquidated damages.

ARTICLE IV. PAYMENT AND RETENTION.

The Owner agrees to pay the Contractor in current funds _____ Dollars ($_____) for work satisfactorily performed after receipt of properly documented and submitted Applications for Payment and to make payments on account thereof, as provided in the General Conditions.

The above contract price does not include any special allowance or general contingency allowance.

The Owner has made a finding that this Project is substantially complex and requires a retention amount greater than 5%. (Public Contract Code section 7201.)

ARTICLE V. CHANGES.

Changes in this Agreement or in the Work to be done under this Agreement shall be

made as provided in the General Conditions.

ARTICLE VI. TERMINATION.

The Owner or Contractor may terminate the Contract as provided in the General Conditions.

ARTICLE VII. PREVAILING WAGES.

The Project is a public work, the Work shall be performed as a public work and pursuant to the provisions of Section 1770 et seq. of the Labor Code of the State of California, which are hereby incorporated by reference and made a part hereof, the Director of Industrial Relations has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which the Work is to be performed, for each craft, classification or type of worker needed to execute this Contract. Per diem wages shall be deemed to include employer payments for health and welfare, pension, vacation, apprenticeship or other training programs, and similar purposes. Copies of the rates are on file at the Owner's principal office, or are available at https://www.dir.ca.gov/oprl/dprewagedetermination.htm. The rate of prevailing wage for any craft, classification or type of workmanship to be employed on this Project is the rate established by the applicable collective bargaining agreement which rate so provided is hereby adopted by reference and shall be effective for the life of this Agreement or until the Director of the Department of Industrial Relations determines that another rate be adopted. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workers employed in the execution of this Agreement.

The Contractor and any subcontractor under the Contractor as a penalty to the Owner shall forfeit not more than Two Hundred Dollars ($200.00) for each calendar day or portion thereof for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed. The difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

The Contractor and each Subcontractor shall keep or cause to be kept an accurate record for Work on this Contract and Project showing the names, addresses, social security numbers, work classification, straight time and overtime hours worked and occupations of all laborers, workers and mechanics employed by them in connection with the performance of this Contract or any subcontract thereunder, and showing also the actual per diem wage paid to each of such workers, which records shall be open at all reasonable hours to inspection by the Owner, its officers and agents and to the representatives of the Division of Labor Standards Enforcement of the State Department of Industrial Relations. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner.

Public works projects shall be subject to compliance monitoring and enforcement by the Department of Industrial Relations. For all projects over Twenty-Five Thousand Dollars ($25,000), a contractor or subcontractor shall not be qualified to submit a bid or to be listed in a bid proposal subject to the requirements of Public Contract Code section 4104 unless currently registered and qualified under Labor Code section 1725.5 to perform public work as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code. For all projects over Twenty-Five Thousand Dollars ($25,000), a contractor or subcontractor shall not be qualified to enter into, or engage in the performance of, any contract of public work (as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code) unless currently registered and qualified under Labor Code section 1725.5 to perform public work.

ARTICLE VIII. WORKING HOURS.

In accordance with the provisions of Sections 1810 to 1815, inclusive, of the Labor Code of the State of California, which are hereby incorporated and made a part hereof, the time of service of any worker employed by the Contractor or a Subcontractor doing or contracting to do any part of the Work contemplated by this Agreement is limited and restricted to eight hours during any one calendar day and forty hours during any one calendar week, provided, that work may be performed by such employee in excess of said eight hours per day or forty hours per week provided that compensation for all hours worked in excess of eight hours per day, and forty hours per week, is paid at a rate not less than one and one-half (1½) times the basic rate of pay. The Contractor and every Subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by them in connection with the Work. The records shall be kept open at all reasonable hours to inspection by representatives of the Owner and the Division of Labor Law Enforcement. The Contractor shall as a penalty to the Owner forfeit Twenty-five Dollars ($25.00) for each worker employed in the execution of this Agreement by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any one calendar day, and forty hours in any one calendar week, except as herein provided.

ARTICLE IX. APPRENTICES.

The Contractor agrees to comply with Chapter 1, Part 7, Division 2, Sections 1777.5 and 1777.6 of the California Labor Code, which are hereby incorporated and made a part hereof. These sections require that contractors and subcontractors employ apprentices in apprenticeable occupations in a ratio of not less than one hour of apprentice's work for each five hours of work performed by a journeyman (unless an exemption is granted in accordance with Section 1777.5) and that contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public works solely on the ground of sex, race, religious creed, national origin, ancestry or color. Only apprentices as defined in Labor Code Section 3077, who are in training under apprenticeship standards and who have signed written apprentice agreements, will be employed on public works in apprenticeable occupations. The responsibility for compliance with these provisions is fixed with the Contractor for all

apprenticeable occupations.

ARTICLE X. DSA OVERSIGHT PROCESS.

The Contractor must comply with the applicable requirements of the Division of State Architect ("DSA") Construction Oversight Process ("DSA Oversight Process"), including but not limited to (a) notifying the Owner's Inspector of Record/Project Inspector ("IOR") upon commencement and completion of each aspect of the Work as required under DSA Form 156; (b) coordinating the Work with the IOR's inspection duties and requirements; (c) submitting verified reports under DSA Form 6-C; and (d) coordinating with the Owner, Owner's Architect, any Construction Manager, any laboratories, and the IOR to meet the DSA Oversight Process requirements without delay or added costs to the Work or Project.

Contractor shall be responsible for any additional DSA fees related to review of proposed changes to the DSA-approved construction documents, to the extent the proposed changes were caused by Contractor's wrongful act or omissions. If inspected Work is found to be in non-compliance with the DSA-approved construction documents or the DSA-approved testing and inspection program, then it must be removed and corrected. Any construction that covers unapproved or uninspected Work is subject to removal and correction, at Contractor's expense, in order to permit inspection and approval of the covered work in accordance with the DSA Oversight Process.

ARTICLE XI. INDEMNIFICATION AND INSURANCE.

The Contractor will defend, indemnify and hold harmless the Owner, its governing board, officers, agents, trustees, employees and others as provided in the General Conditions.

By this statement the Contractor represents that it has secured the payment of Workers' Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provisions of said Code. The Contractor shall supply the Owner with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the Owner will receive thirty (30) days' notice of cancellation.

Contractor shall provide the insurance set forth in the General Conditions throughout performance of the Contract. Contractor's comprehensive general and automobile liability insurance shall be written for not less than the following limits of liability:

Comprehensive General Liability

Each Occurrence: $1,000,000 Each Occurrence	Damage to Rented Premises: $1,000,000 Each Occurrence
Medical Expenses:	Personal and Advertising Injury:

$1,000,000 Any One Person

$1,000,000 Each Occurrence

General Aggregate:
$2,000,000 Aggregate

Products – Completed Operations:
$2,000,000 Aggregate

Comprehensive Automobile Liability

Combined Single Limit:
$1,000,000 Each Accident

Property Damage:
$1,000,000 Each Accident

Workers' Compensation

Worker's compensation insurance as required by Labor Code section 3200, *et seq*.

Employers' Liability

$1,500,000 Each Accident
$1,500,000 Disease – Each Employee
$1,500,000 Disease – Policy Limit

ARTICLE XII. ENTIRE AGREEMENT.

The Contract constitutes the entire agreement between the parties relating to the Work, and supersedes any prior or contemporaneous agreement between the parties, oral or written, including the Owner's award of the Contract to Contractor, unless such agreement is expressly incorporated herein. The Owner makes no representations or warranties, express or implied, not specified in the Contract. The Contract is intended as the complete and exclusive statement of the parties' agreement pursuant to Code of Civil Procedure section 1856.

ARTICLE XIII. EXECUTION OF OTHER DOCUMENTS.

The parties to this Agreement shall cooperate fully in the execution of any and all other documents and in the completion of any additional actions that may be necessary or appropriate to give full force and effect to the terms and intent of the Contract.

ARTICLE XIV. EXECUTION IN COUNTERPARTS.

This Agreement may be executed in counterparts such that the signatures may appear on separate signature pages. A copy, or an original, with all signatures appended together, shall be deemed a fully executed Agreement.

ARTICLE XV. BINDING EFFECT.

Contractor, by execution of this Agreement, acknowledges that Contractor has read this

Agreement and the other Contract Documents, understands them, and agrees to be bound by their terms and conditions. The Contract shall inure to the benefit of and shall be binding upon the Contractor and the Owner and their respective successors and assigns.

ARTICLE XVI. SEVERABILITY; GOVERNING LAW; CHOICE OF FORUM.

If any provision of the Contract shall be held invalid or unenforceable by a court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision hereof. The Contract shall be governed by the laws of the State of California. Any action or proceeding seeking any relief under or with respect to this Agreement shall be brought solely in the Superior Court of the State of California for the County of Alameda, subject to transfer of venue under applicable State law, provided that nothing in this Agreement shall constitute a waiver of immunity to suit by Owner.

ARTICLE XVII. AMENDMENTS.

The terms of the Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever except by written agreement, including a change order, signed by the parties and approved or ratified by the Governing Board.

ARTICLE XVIII. ASSIGNMENT OF CONTRACT.

The Contractor shall not assign or transfer by operation of law or otherwise any or all of its rights, burdens, duties or obligations without the prior written consent of the surety on the payment bond, the surety on the performance bond and the Owner.

ARTICLE XIX. WRITTEN NOTICE.

Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified or overnight mail to the last business address known to the person who gives the notice.

ARTICLE XX. SANCTIONS IN RESPONSE TO RUSSIAN AGGRESSION.

The Owner requires Contractor to comply with the Governor's March 4, 2022, Executive Order N-6-22 ("Order") relating to any existing sanctions imposed by the United States government and the State of California in response to Russia's actions in Ukraine, including additional reporting requirements for contracts of $5 million or more. Failure to comply may result in the termination of the Contract.

_____ (*CONTRACTOR***)** **HAYWARD UNIFIED SCHOOL DISTRICT**

_____ _____
_____ (*Name*) _____ (*Name*)
_____ (Chairman, Pres., or Vice-Pres.) _____ (*Title*)

_____
_____ (*Name*)
_____ (Secretary, Asst. Secretary, CFO, or Asst. Treasurer)

_____
CALIFORNIA CONTRACTOR'S
LICENSE NO.

_____
LICENSE EXPIRATION DATE

NOTE: Contractor must give the full business address of the Contractor and sign with Contractor's usual signature. Partnerships must furnish the full name of all partners and the Agreement must be signed in the partnership name by a general partner with authority to bind the partnership in such matters, followed by the signature and designation of the person signing. The name of the person signing shall also be typed or printed below the signature. Corporations must sign with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the chairman of the board, president or any vice president, and then followed by a second signature by the secretary, assistant secretary, the chief financial officer or assistant treasurer. All persons signing must be authorized to bind the corporation in the matter. The name of each person signing shall also be typed or printed below the signature. Satisfactory evidence of the authority of the officer signing on behalf of a corporation shall be furnished.

PERFORMANCE BOND

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Principal, and _____, as Surety, are held and firmly bound unto the Hayward Unified School District, in the County of Alameda, State of California, hereinafter called the "Owner," in the sum of _____ Dollars ($_____) for the payment of which sum well and truly made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, to the Owner for the full performance of a certain contract with the Owner, the terms of which are incorporated herein by reference, dated _____, 20___, for construction of

Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades (the "Contract").

The condition of this obligation is such that**,** if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by the Owner, with or without notice to the Surety, during the period of time specified in the Contract after completion for correction of faulty or improper materials and workmanship, and during the life of any guaranty or warranty required under the Contract, and also shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreement of any and all duly authorized modifications of said Contract that may hereafter be made, then this obligation is to be void, otherwise to remain in full force and virtue.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or the specifications accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the Work, or to the specifications.

No further agreement between Surety and Owner shall be required as a prerequisite to the Surety performing its obligations under this bond. In the event that the Surety elects to complete the Work of the Contract after termination of the Contract by Owner, the Surety may not hire Principal, or any of Principal's owners, employees, or subcontractors, to perform the Work without the written consent of Owner, and the Owner may grant or withhold such consent within its sole discretion.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals this _____ day of _____, 20__,
hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(To be signed by)
(Principal and Surety,)
(and acknowledged and)
(Notarial Seal attached)

(Affix Corporate Seal)

_____
(Individual Principal)

_____
(Business Address)

(Affix Corporate Seal)

_____
(Corporate Principal)

_____
(Business Address)

(Affix Corporate Seal)

_____
(Corporate Surety)

_____
(Business Address)

_____

By:_____

_____

The rate of premium on this bond is _____ per thousand.

The total amount of premium charged is _____.

The above must be filled in by Corporate Surety.

PAYMENT BOND
(Labor and Material)

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS:

That WHEREAS, the Hayward Unified School District (the "Owner" of the public works contract described below) and _____, hereinafter designated as the "Principal," have entered into a Contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to construct

the **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades, at Tennyson High School, Hayward, CA 94544**

which said agreement dated _____, 20__, and all of the Contract Documents are hereby referred to and made a part hereof;

and

WHEREAS, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by whom the Contract is awarded to secure the claims arising under said agreement.

NOW, THEREFORE, THESE PRESENTS WITNESSETH:

That the said Principal and the undersigned _____ ("Surety") are held and firmly bound unto all laborers, material men, and other persons, and bound for all amounts due, referred to in Civil Code section 9554, subdivision (b), in the sum of _____ Dollars ($_____) which sum well and truly be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The condition of this obligation is that if the said Principal or any of its subcontractors, or the heirs, executors, administrators, successors, or assigns of any, all, or either of them, shall fail to pay any of the persons named in Civil Code section 9100, or any of the amounts due, as specified in Civil Code section 9554, subdivision (b), that said Surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay costs and reasonable attorney's fees to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

And the said Surety, for value received, thereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of said contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety this _____ day of _____, 20__.

(To be signed by)
(Principal and Surety,)
(and acknowledged and)
(Notarial Seal attached)

_____
Principal

_____

_____
Surety

_____

By:_____
Attorney-in-Fact

_____

The above bond is accepted and approved this ____ day of _____.

DRUG-FREE WORKPLACE CERTIFICATION

The Drug-Free Workplace Act of 1990 (Government Code sections 8350 *et seq*.) requires that every person or organization awarded a contract or grant for the procurement of any property or services from any State agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract awarded by a State agency may be subject to suspension of payments or termination of the contract, or both, and the contractor may be subject to debarment from future contracting if the state agency determines that specified acts have occurred.

Pursuant to Government Code Section 8355, every person or organization awarded a contract or grant from a State agency shall certify that it will provide a drug-free workplace by doing all of the following:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in the person's or organization's workplace and specifying actions which will be taken against employees for violations of the prohibition;

(b) Establishing a drug-free awareness program to inform employees about all of the following:

(1) The dangers of drug abuse in the workplace;
(2) The person's or organization's policy of maintaining a drug-free workplace;
(3) The availability of drug counseling, rehabilitation and employee-assistance programs;
(4) The penalties that may be imposed upon employees for drug abuse Violations;

(c) Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required by subdivision (a) and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

I, the undersigned, agree to fulfill the terms and requirements of Government Code Section 8355 listed above and will publish a statement notifying employees concerning (a) the prohibition of controlled substance at the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required by Section 8355(a) and requiring that the employee agree to abide by the terms of that statement.

I also understand that if the Owner determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of Section 8355, that the contract or grant awarded herein is subject to suspension of payments, termination, or both. I further understand that should I violate

the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of Section 8350 *et seq*.

I acknowledge that I am aware of the provisions of Government Code Section 8350 *et seq*. and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

_____

Name of Contractor

_____

Signature

_____ _____

Print Name Date

PRIME BIDDER CERTIFICATION OF DISABLED VETERAN

BUSINESS ENTERPRISE PARTICIPATION

To be completed by the Prime Bidder

PART I – IDENTIFICATION INFORMATION

BIDDER'S NAME	BUSINESS ADDRESS	TELEPHONE NUMBER
SCHOOL DISTRICT	**COUNTY**	**APPLICATION NO.**

PART II – METHOD OF COMPLIANCE WITH DVBE PARTICIPATION GOALS – Include this form and any other applicable documents listed in this table with your bid/proposal. Read the three columns in the table below as sentences from left to right. Check the appropriate box to indicate your method of committing the contract dollar amount.

NOTE: *Architectural, engineering, environmental, land surveying or construction management firms must indicate their method of compliance by marking the appropriate box A, B, C, or D after selection by the District and before the contract is signed.*

YOUR BUSINESS ENTERPRISE	AND YOU	AND YOU
A. □ *is Disabled Veteran owned and your forces, will perform at least 3 percent of this contract*	*will include a copy of your DVBE letter from the Office of Small Business and Disabled Veteran Business Enterprise Services (OSDS).*	
B. □ *is Disabled Veteran owned* ***but is unable*** *to perform the 3 percent of this contract with your forces*	*will use DVBE subcontractors/ suppliers to bring the contract participation to at least 3 percent*	*will include a copy of each DVBE's letter from OSDS (including yours, if applicable).*
C. □ *is* ***not*** *Disabled Veteran owned*	*will use DVBE subcontractors/ suppliers for at least 3 percent of this contract*	
D. □ *is unable to meet the required participation goals*	*will complete a Good Faith Effort to obtain DVBE participation*	*will include the Prime Bidder's Good Faith Effort Worksheet.*

Note: An Office of Small Business and Disabled Veteran Business Enterprise Services (OSDS) letter must be attached for each DVBE participating in the contract. The DVBE letter is obtained by application through the OSDS and must be provided at the time of bid opening. If the letter is not provided, the bid may be deemed nonresponsive and may be ineligible for award of the contract.

Continued on reverse side

PART III – DVBE DOLLAR PARTICIPATION OF BID/PROPOSAL – *Architectural, engineering, environmental, land surveying or construction management firms complete this part **after** selection by the district and before the contract is signed.*

Show deductive alternate(s) in parenthesis. For more alternates/base bids, use a separate page to show items

A. If your business enterprise is a DVBE, list in the appropriate column the total dollar amount of your bid to be performed by your own participation.

B. List all your DVBE subcontractors/suppliers. Enter in the appropriate column the dollar amount for each of your subcontractors/suppliers.

C. Enter the total of Lines A and B for each column.

D. Enter the dollar amount of the bid/proposal to be performed by **non**-DVBE firms. Note: This line is the sum of the prime and subcontractor(s) **non**-DVBE dollar participation.

E. Enter the sum of the column totals from Line C and Line D. Note: Please be aware that the final determination of DVBE compliance is made based on the contract amount resulting from the district's acceptance or rejection of alternates.

	BASE BID/PROPOSAL	ALTERNATE #1	ALTERNATE #2	ALTERNATE #3 OR BASE BID B	ALTERNATE #4 OR BASE BID C	ALTERNATE #5 (Modernization or Reconstruction Only)
A. Prime Bidder, *if DVBE (own participation)*	$	$	$	$	$	$
B. DVBE Subcontractor or Supplier						
1.						
2.						
3.						
4.						
C. Subtotal (A & B)						
D. Non-DVBE						
E. Total Bid						

PRIME BIDDER GOOD FAITH EFFORT WORKSHEET

This worksheet is to be used to assist the Prime Bidder in meeting the 3% DVBE participation goal

BIDDER'S NAME	BUSINESS ADDRESS	CONTACT PERSON
TELEPHONE NUMBER	OWNER	COUNTY

GENERAL INSTRUCTIONS:

This worksheet is to be used to assist you in meeting the 3 percent DVBE participation goal. If specific information is not provided for Parts I through III, you do not meet the test of the "Good Faith Effort" and cannot so certify. If you are qualifying based on a "Good Faith Effort" you must include this form with your bid/proposal to the Owner.

PART I – CONTACTS

To identify DVBE subcontractors/suppliers for participation in your bid/proposal, contact must be made with each of the following categories. It is recommended that you contact several DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
1. Owner			
2. Office of Small Business and Disabled Veteran Business Enterprise Services (OSDS). OSDS provides assistance locating DVBE's at https://caleprocure.ca.gov/pages/PublicSearch/suppliersearch.aspx	(916) 375-4940		
3. DVBE Organizations (*List*):			
4. Write "recorded message" in this column, if applicable.			

PART II – ADVERTISEMENTS *You must make at least two (2) advertisements, one (1) in a paper that focuses on DVBE and one (1) in a trade paper. Advertisements should be published at least 14 days prior to bid/proposal opening; if you cannot advertise 14 days prior, advertise as soon as possible and provide an explanation. (Advertisements must be published in time to allow for a reasonable response). Advertisements must include that your firm is seeking DVBE participation, the project name and location, your firm's name, your firm's contact person, and phone number.*

Attach copies of advertisements to this form.

FOCUS/TRADE PAPER NAME	CHECK ONE		DATE OF ADVERTISEMENT
	TRADE	FOCUS	

PART III – DVBE SOLICITATIONS *List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use a separate page and attach to this form.*

IF THE DVBE…..	THEN…..	AND…..
Was selected to participate	Check "yes" in the "SELECTED" column, include the applicable dollar amount in Part III of the Prime Bidder Certification	Include a copy of their DVBE letter from OSDS.
Was **not** selected to participate	Check "no" in the "SELECTED" column	State why in the "REASON NOT SELECTED" column.
Did not respond to your solicitation	Check the "NO RESPONSE" column	

DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASON NOT SELECTED	NO RESPONSE
	YES	NO	*This section must be completed*	

IMPORTANT NOTE:

Please be aware that certification of the "Good Faith Effort" may only be made if you fully complete Parts I, II, and III on both sides of this form. A copy of this form must be retained by you and may be subject to a future audit.

CERTIFICATION

I, _____ certify that I am the bidder's Chief Executive Officer and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. In making this certification, I am aware of Section 12650 et seq. of the Government Code providing for the imposition of treble damages for making false claims.

_____

SIGNATURE OF CHIEF EXECUTIVE OFFICER DATE

FINGERPRINTING NOTICE AND ACKNOWLEDGMENT FOR CONSTRUCTION CONTRACTS

(Education Code Section 45125.2)

Business entities entering into contracts with the Owner for the construction, reconstruction, rehabilitation or repair of a facility may comply with Education Code section 45125.2, in which case it would not have to comply with Section 45125.1. If such an entity is not compliant with Section 45125.2, then it must comply with Section 45125.1. Such entities are responsible for ensuring full compliance with the law and should therefore review all applicable statutes and regulations. Therefore, the following information is provided simply to assist you with compliance with the law:

1. The Owner has determined that your employee(s), or you as a sole proprietor, will have more than limited contact with students, therefore the law requires that you must use one or more of the following methods to ensure the safety of pupils (Education Code §45125.2(a)):

    a. Install a physical barrier at the worksite to limit contact with pupils.

    b. If you are not a sole proprietorship, have one of your employees, whom the Department of Justice has ascertained has not been convicted of a violent or serious felony (see ***Attachment A*** to this Notice and Acknowledgement), continually monitor and supervise all of your employees. For the Department of Justice to so ascertain, your employee may submit fingerprints to the Department of Justice pursuant to Education Code section 45125.1(a).

    c. Arrange, with Owner's approval, for surveillance of your employees by Owner's personnel.

    Prior to commencing the Work, you shall submit the Independent Contractor Student Contact Form (see ***Attachment B*** to this Notice and Acknowledgement) to the Owner, which will indicate which of the above methods you will use.

2. If you are providing services in an emergency or exceptional situation, you are not required to comply with Education Code section 45125.2, above. An "emergency or exceptional" situation is one in which pupil health or safety is endangered or when repairs are needed to make a facility safe and habitable. Owner shall determine whether an emergency or exceptional situation exists. (Education Code §45125.2(d).)

3. If you use one or more of the three methods in Section 1 (above), you are not required to comply with Education Code section 45125.1. (Education Code §45125.2(b).)

I have read the foregoing and agree to comply with the requirements of this notice and Education Code sections 45125.1 and 45125.2 as applicable.

Dated: _____ _____

Signature

Name: _____ Title: _____

ATTACHMENT A

Violent and Serious Felonies

Under Education Code section 45125.2, no employee of a contractor or subcontractor who has been convicted of or has criminal proceedings pending for a violent or serious felony may come into contact with any student. A violent felony is any felony listed in subdivision (c) of Section 667.5 of the Penal Code. Those felonies are presently defined as:

(1) Murder or voluntary manslaughter.

(2) Mayhem.

(3) Rape as defined in paragraph (2) or (6) of subdivision (a) of Section 261 or paragraph (1) or (4) of subdivision (a) of Section 262.

(4) Sodomy as defined in subdivision (c) or (d) of Section 286.

(5) Oral copulation as defined in subdivision (c) or (d) of Section 288a.

(6) Lewd or lascivious act as defined in subdivision (a) or (b) of Section 288.

(7) Any felony punishable by death or imprisonment in the state prison for life.

(8) Any felony in which the defendant inflicts great bodily injury on any person other than an accomplice which has been charged and proved as provided for in Section 12022.7, 12022.8, or 12022.9 on or after July 1, 1977, or as specified prior to July 1, 1977, in Sections 213, 264, and 461, or any felony in which the defendant uses a firearm which use has been charged and proved as provided in subdivision (a) of Section 12022.3, or Section 12022.5 or 12022.55.

(9) Any robbery.

(10) Arson, in violation of subdivision (a) or (b) of Section 451.

(11) Sexual penetration as defined in subdivision (a) or (j) of Section 289.

(12) Attempted murder.

(13) A violation of Section 18745, 18750, or 18755.

(14) Kidnapping.

(15) Assault with the intent to commit a specified felony, in violation of Section 220.

(16) Continuous sexual abuse of a child, in violation of Section 288.5.

(17) Carjacking, as defined in subdivision (a) of Section 215.

(18) Rape, spousal rape, or sexual penetration, in concert, in violation of Section 264.1.

(19) Extortion, as defined in Section 518, which would constitute a felony violation of Section 186.22 of the Penal Code.

(20) Threats to victims or witnesses, as defined in Section 136.1, which would constitute a felony violation of Section 186.22 of the Penal Code.

(21) Any burglary of the first degree, as defined in subdivision (a) of Section 460, wherein it is charged and proved that another person, other than an accomplice, was present in the residence during the commission of the burglary.

(22) Any violation of Section 12022.53.

(23) A violation of subdivision (b) or (c) of Section 11418.

A serious felony is any felony listed in subdivision (c) Section 1192.7 of the Penal Code. Those felonies are presently defined as:

> (1) Murder or voluntary manslaughter; (2) Mayhem; (3) Rape; (4) Sodomy by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person; (5) Oral copulation by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person; (6) Lewd or lascivious act on a child under the age of 14 years; (7) Any felony punishable by death or imprisonment in the state prison for life; (8) Any felony in which the defendant personally inflicts great bodily injury on any person, other than an accomplice, or any felony in which the defendant personally uses a firearm; (9) Attempted murder; (10) Assault with intent to commit rape, or robbery; (11) Assault with a deadly weapon or instrument on a peace officer; (12) Assault by a life prisoner on a non-inmate; (13) Assault with a deadly weapon by an inmate; (14) Arson; (15) Exploding a destructive device or any explosive with intent to injure; (16) Exploding a destructive device or any explosive causing bodily injury, great bodily injury, or mayhem; (17) Exploding a destructive device or any explosive with intent to murder; (18) Any burglary of the first degree; (19) Robbery or bank

robbery; (20) Kidnapping; (21) Holding of a hostage by a person confined in a state prison; (22) Attempt to commit a felony punishable by death or imprisonment in the state prison for life; (23) Any felony in which the defendant personally used a dangerous or deadly weapon; (24) Selling, furnishing, administering, giving, or offering to sell, furnish, administer, or give to a minor any heroin, cocaine, phencyclidine (PCP), or any methamphetamine-related drug, as described in paragraph (2) of subdivision (d) of Section 11055 of the Health and Safety Code, or any of the precursors of methamphetamines, as described in subparagraph (A) of paragraph (1) of subdivision (f) of Section 11055 or subdivision (a) of Section 11100 of the Health and Safety Code; (25) Any violation of subdivision (a) of Section 289 where the act is accomplished against the victim's will by force, violence, duress, menace, or fear of immediate and unlawful bodily injury on the victim or another person; (26) Grand theft involving a firearm; (27)carjacking; (28) any felony offense, which would also constitute a felony violation of Section 186.22; (29) assault with the intent to commit mayhem, rape, sodomy, or oral copulation, in violation of Section 220; (30) throwing acid or flammable substances, in violation of Section 244; (31) assault with a deadly weapon, firearm, machine gun, assault weapon, or semiautomatic firearm or assault on a peace officer or firefighter, in violation of Section 245; (32) assault with a deadly weapon against a public transit employee, custodial officer, or school employee, in violation of Sections 245.2, 245.3, or 245.5; (33) discharge of a firearm at an inhabited dwelling, vehicle, or aircraft, in violation of Section 246; (34) commission of rape or sexual penetration in concert with another person, in violation of Section 264.1; (35) continuous sexual abuse of a child, in violation of Section 288.5; (36) shooting from a vehicle, in violation of subdivision (c) or (d) of Section 26100; (37) intimidation of victims or witnesses, in violation of Section 136.1; (38) criminal threats, in violation of Section 422; (39) any attempt to commit a crime listed in this subdivision other than an assault; (40) any violation of Section 12022.53; (41) a violation of subdivision (b) or (c) of Section 11418; and (42) any conspiracy to commit an offense described in this subdivision.

ATTACHMENT B

STUDENT CONTACT FORM
FOR CONSTRUCTION CONTRACTS

Note: This form must be submitted by Contractor before it may commence any work.

Contractor Firm Name: _____
Supervisor/Foreman Name: _____
Start Date: _____
Completion Date: _____
Location of Work: _____
Hours of Work: _____
Length of Time on Grounds: _____
Number of Employees on the Job: _____

I am an owner or officer of Contractor authorized to sign this document on behalf of Contractor. Contractor acknowledges that the Owner has determined that Contractor's employees, or that Contractor as a sole proprietor, will have more than limited contact with students. Therefore, in order to comply with Education Code section 45125.2, Contractor will use the following methods to ensure student safety (check at least one):

[ ] A physical barrier will be installed at the worksite to limit contact with pupils.

[ ] Contractor is not a sole proprietorship, and its employees will be continually monitored and supervised by one of its employees who has not been convicted of a violent or serious felony.

Name of Supervising Employee:
_____

Date of Department of Justice verification that supervising employee has not been convicted of a violent or serious felony:
_____

Name of employee who is the custodian of the Department of Justice verification information:
_____

[ ] The Owner has agreed that Contractor's employees, or Contractor as sole proprietor, will be surveilled by Owner's personnel.

If Contractor does not comply with the requirements of Education Code section 45125.2, then Contractor will comply with the requirements of Education Code section 45125.1.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Dated: _____

Signature: _____
Typed Name: _____
Title: _____
Contractor: _____

SUFFICIENT FUNDS DECLARATION
(Labor Code section 2810)

To Be Executed by Bidder and Submitted with Bid

Owner: Hayward Unified School District
Contract: Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades
Site: Tennyson High School

I, _____, declare that I am the _____ *[insert title]* of _____, the entity making and submitting the bid for the above Project that accompanies this Declaration, and that such bid includes sufficient funds to permit _____ *[insert name of entity]* to comply with all local, state or federal labor laws or regulations during the Project, including payment of prevailing wage, and that _____ *[insert name of entity]* will comply with the provisions of Labor Code section 2810(d) if awarded the Contract.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and executed on _____, 20__, at _____ *[city]*, _____ *[state]*.

Date: _____ _____

Signature

Print Name: _____

Print Title: _____

WORKERS' COMPENSATION CERTIFICATE

Labor Code Section 3700, in relevant part, provides:

> "Every employer except the state shall secure the payment of compensation in one or more of the following ways:
>
> (a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.
>
> (b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer or as one employer in a group of employers. Said certificate may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees, … "

I am aware of the provisions of the Labor Code Section 3700 which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract. I shall supply the Owner with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the Owner will receive thirty (30) days' notice of cancellation.

_____

Name of Contractor

_____

Signature

_____ _____

Print Name Date

(In accordance with Article 5 (commencing at Section 1860], Chapter 1, Part 7, Division 2 of the Labor Code, the above certificate must be signed and filed with the awarding body prior to performing any work under the contract.)

CARB COMPLIANCE DECLARATION

To Be Executed by Bidder and

Submitted (including attachments) Prior to Award of Contract

Owner: Hayward Unified School District
Contract: **26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades**
Site: Tennyson High School

Background

CALIFORNIA AIR RESOURCES BOARD ("CARB") https://ww2.arb.ca.gov/

For any project awarded on or after January 1, 2024, Public Works Awarding Bodies are required to obtain valid CARB **Certificates of Reported Compliance ("CRC")** from all contractors and listed subcontractors before awarding the contract for the project. The Public Works Awarding Body will be required to retain CRCs for three years after the project is complete, and the CRCs are subject to CARB review upon five calendar days' notice.

The Regulations apply to all "Public Works Awarding Bodies," which phrase is broadly defined as "any public agency (state, county, city, school district, community college district, water district, sanitation district, transit district, etc.), or official thereof, in the state of California, that awards or enters into a contract for the erection, construction, alteration, repair, removal, or improvement of any public structure, building, road, or other public lands, property, or improvement of any kind."

The bidder must fully execute this document and submit it, including the required attachments, prior to award of the contract for the above-captioned contract for the project. The bidder must attach the CRCs for the bidder and all of its subcontractors to this document.

The ARB Diesel Off-Road Online Reporting System (DOORS) reporting system is where the bidder and its subcontractors are able to obtain their CRCs: DOORS (ca.gov). There is also an additional website that provides them with more information on the regulation along with FAQs and user guides. The website for the "Off-Road Zone" is https://ww2.arb.ca.gov/our-work/programs/truckstop-resources/road-zone.

If any questions, please call the DOORS Hotline at 877-593-6677 or email <doors@arb.ca.gov. Please note that at this time DOORS staff has limited access to documents received via mail and fax is unavailable.

Fact Sheet: Contracting Requirements | California Air Resources Board
https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements

Fact Sheet: Renewable Diesel Fuel Requirements | California Air Resources Board
https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-renewable-diesel-fuel-requirements

Fact Sheet: Added Vehicle Restrictions and Tier Phase-Out Requirements | California Air Resources Board
https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-added-vehicle-restrictions-and-tier-phase-out-requirements

Declaration

I, _____ *[name of declarant]*, declare that I am the _____ *[title]* of _____ *[name of bidding contractor]*, the entity making and submitting a bid for the above contract for the project; that all CRCs for _____ *[name of bidding contractor]* , and for all of its listed subcontractors on the above contract, are attached to this declaration; that all of the attached CRCs are current and valid; and that the attached CRCs will allow the Owner to comply with the applicable CARB requirements in connection with the contract.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and executed on _____, 20__, at _____ *[city]*, _____ *[state]*.

Date: _____ _____

Signature

Print Name: _____

Print Title: _____

NOTICE OF AWARD OF
DESIGN-BID-BUILD CONTRACT

DATE: _____

TO: _____

ADDRESS: _____

CONTRACT: **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades**

Please take notice that the above contract has been awarded by the Hayward Unified School District ("Owner") to you, in the amount of _____ Dollars ($_____).

1. You must deliver the following documents to the Owner by the tenth (10th) day following the date of this Notice of Award and prior to the commencement of the Work:

   a. *Two fully executed counterparts of the Agreement (see attached form). Each copy of the Agreement must bear your original signature on the signature page.*
   b. *One original of the Performance Bond using the form included in the bid package that is executed by you and your surety.*
   c. *One original of the Payment Bond using the form included in the bid package that is executed by you and your surety.*
   d. *One original set of the insurance certificates with endorsements required under the General Conditions.*
   e. *An executed Drug-Free Workplace Certification.*
   f. *An executed Student Contact Form.*
   g. *Any other documents required by the Instructions to Bidders to be submitted by the tenth (10th) day following this Notice of Award and prior to the commencement of the Work.*

2. You must deliver the certified baseline schedule (see General Conditions §3.9.1) to the Owner within two weeks of award of the Contract and prior to the commencement of the Work.

3. Any failure to deliver these documents within the time specified would allow the Owner to deem your bid to have been abandoned, to annul this Notice of Award, and to declare your bid security to have been forfeited.

4. Before you may start any Work, you must attend a preconstruction conference. The preconstruction conference may be arranged through Owner's representative, _____ at _____@_____.___. Questions regarding bonds and insurance may be directed to _____ at _____@_____.___. All other inquiries regarding the Project should be directed to _____ at _____@_____.___.

5. Upon commencement of the Work, you and each of your Subcontractors shall certify, maintain, and furnish payroll records as required by the Division of Labor Standards Enforcement, in accordance with California Labor Code Sections 1776 and 1771.4.

OWNER:

_____

Name: _____

Title: _____

NOTICE TO PROCEED

DATE: _____, 20___

TO: _____, Inc., _____, _____, CA 9_____

CONTRACT: **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades**

The Hayward Unified School District ("Owner") hereby notifies you that the Contract Time (see Article III of the Agreement for the above Contract) will commence to run on June 10, 2026. On that date, you may commence performance of your obligations with respect to Work under the Contract Documents. However, before you start any Work at the site, you must have submitted all documents required by the Instructions to Bidders, the Notice of Award, and the General Conditions, including a schedule of values.

Please note that all requests or claims for additional money or time must comply with the contract's requirements, including General Conditions section 4.5, or else you may waive your right to recover additional money or time.

OWNER:

_____
Name: _____
Title: _____

POST-AWARD
MATERIAL SUBSTITUTION REQUEST

Contract: **Bid No. 26.006 Tennyson HS Locker Rooms/Gym Floor Upgrades Project**
Owner: Hayward Unified School District

1. Pursuant to the Contract requirements for the Work, the Contract Sum is for the Work as shown on the drawings, described in the specifications, and otherwise defined in the Contract Documents. However, the undersigned proposes the following substitutions for the Owner's consideration. All substitution requests shall be submitted in compliance with the Contract Documents.

2. Please complete this table for each request, attaching additional sheets as necessary:

Specified Product or Material	Drawing Number or Specification Section	Proposed Substitution	Estimated Cost and Time Impact

3. In addition to this form, for each requested substitution the Contractor must provide sufficient proof that the substitution is equal to the specified product or material in every respect.

4. If a substitution request is approved by Owner as an equal, such approval (including the contract sum and contract time adjustments specified above) shall be memorialized by a signed and Board-approved change order pursuant to the Contract Documents; and any cost or time impacts in addition to the adjustments specified above shall be borne by Contractor, including but not limited to the time required obtaining shop drawings, ordering materials, making modifications, testing, or whatever else is necessary to make the substitution function properly in place of the originally specified item.

5. Contractor hereby certifies that the requested substitutions are equal or better in all respects to what is specified and will perform satisfactorily under the conditions and use indicated in the Contract Documents, unless otherwise noted.

CONTRACTOR: _____

BY: _____

GENERAL CONDITIONS

for

CONTRACT OF CONSTRUCTION

FOR BID NO. 26.006 TENNYSON HS LOCKER ROOMS/GYM FLOOR UPGRAD PROJECT

HAYWARD UNIFIED SCHOOL DISTRICT

May 14, 2026

SUMMARY OF CONTENTS

ARTICLE 1: GENERAL CONDITIONS 1

ARTICLE 2: OWNER 7

ARTICLE 3: THE CONTRACTOR 10

ARTICLE 4: ADMINISTRATION OF THE CONTRACT 30

ARTICLE 5: SUBCONTRACTORS 47

ARTICLE 6: CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS 53

ARTICLE 7: CHANGES IN THE WORK 55

ARTICLE 8: TIME 63

ARTICLE 9: PAYMENTS AND COMPLETION 68

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY 79

ARTICLE 11: INSURANCE AND BONDS 85

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK 91

ARTICLE 13: MISCELLEOUS PROVISIONS 93

ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT
105

TABLE OF CONTENTS

ARTICLE 1 1
GENERAL CONDITIONS 1
1.1 BASIC DEFINITIONS 1
1.1.1 The Contract Documents 1
1.1.2 The Contract 1
1.1.3 The Work 1
1.1.4 The Project 2
1.1.5 The Drawings 2
1.1.6 The Specifications 2
1.1.7 The Project Manual 2
1.1.8 Or 2
1.1.9 Completion 2
1.1.10 Completion 3
1.2 EXECUTION, CORRELATION AND INTENT 3
1.2.1 Correlation and Intent 3
1.2.1.1 *Documents Complementary and Inclusive* 3
1.2.1.2 *Coverage of the Drawings and Specifications* 3
1.2.1.3 *Conflicts* 3
1.2.1.4 *Conformance With Laws* 3
1.2.1.5 *Ambiguity* 4
1.2.1.6 *Execution* 4
1.2.2 Addenda and Deferred Approvals 5
1.2.2.1 *Addenda* 5
1.2.2.2 *Deferred Approvals* 5
1.2.3 Specification Interpretation 5
1.2.3.1 *Titles* 5
1.2.3.2 *As Shown, Etc* 5
1.2.3.3 *Provide* 5
1.2.3.4 *General Conditions* 5
1.2.3.5 *Abbreviations* 5
1.2.3.6 *Plural* 5
1.2.3.7 *Metric* 5
1.2.3.8 *Standard Specifications* 6
1.2.3.9 *Absence of Modifiers* 6
1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS 6
ARTICLE 2 7
OWNER 7
2.1 DEFINITION 7
2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER 7
2.2.1 Intentionally Left Blank 7
2.2.2 Site Survey 7
2.2.3 Soils 7
2.2.3.1 *Owner Furnished Services* 7
2.2.3.2 *Contractor Reliance* 7
2.2.4 Utility Survey 8
2.2.5 Information 8
2.2.6 Existing Utility Lines; Removal, Relocation 8
2.2.6.1 *Removal, Relocation* 8
2.2.6.2 *Assessment* 8
2.2.6.3 *Notification* 8
2.2.6.4 *Underground Utility Clearance* 9
2.2.7 Easements 9
2.2.8 Reasonable Promptness 9
2.2.9 Copies Furnished 9
2.2.10 Duties Cumulative 9
2.3 OWNER'S RIGHT TO STOP THE WORK 9
2.4 OWNER'S RIGHT TO CARRY OUT THE WORK 9
ARTICLE 3 10
THE CONTRACTOR 10
3.1 DEFINITION 10
3.2 SUPERVISION AND CONSTRUCTION PROCEDURES 10
3.2.1 Contractor 10
3.2.2 Contractor Responsibility 11
3.2.3 Obligations not Changed by Other's Actions 11

3.2.4 Contractor Responsibility for Readiness for Work 11
3.2.5 Project Meetings 11
3.3 SUPERINTENDENT 11
3.3.1 Full Time Superintendent 11
3.3.2 Staff 11
3.3.3 Right to Remove 12
3.4 LABOR AND MATERIALS 12
3.4.1 Contractor to Provide 12
3.4.2 Quality 12
3.4.3 Replacement 12
3.4.4 Discipline 12
3.5 WARRANTY 13
3.6 TAXES 13
3.7 PERMITS, FEES AND NOTICES 13
3.7.1 Payment 13
3.7.2 Compliance 13
3.7.3 Contract Documents 13
3.7.4 Responsibility 14
3.8 ALLOWANCES 14
3.8.1 Contract 14
3.8.2 Scope 14
3.8.2.1 *Prompt Selection* 14
3.8.2.2 *Cost* 14
3.8.2.3 *Cost Included in Contract Sum* 14
3.8.2.4 *Contract Sum Adjustment* 14
3.9 CONTRACTOR'S CONSTRUCTION SCHEDULES 14
3.9.1 Requirements 14
3.9.2 DSA Oversight Process 17
3.9.3 Failure to Meet Requirements 17
3.10 DOCUMENTS AND SAMPLES AT THE SITE 17
3.11 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES 18
3.11.1 Submittals Defined 18
3.11.1.1 *Shop Drawings* 18
3.11.1.2 *Samples* 18
3.11.1.3 *Contractor's Responsibility* 18
3.11.1.4 *Extent of Review* 19
3.11.2 Drawing Submission Procedure 19
3.11.2.1 *Transmittal Letter and Other Requirements* 19
3.11.2.2 *Copies Required* 19
3.11.2.3 *Corrections* 20
3.11.2.4 *Approval Prior to Commencement of Work* 20
3.11.3 Sample Submissions Procedure 20
3.11.3.1 *Samples Required* 20
3.11.3.2 *Labels and Instructions* 20
3.11.3.3 *Architect's Review* 20
3.11.3.4 *Record Drawings and Annotated Specifications* 21
3.11.3.5 *Equipment Manuals* 21
3.11.3.6 *Owner's Property* 21
3.11.4 Substitutions 21
3.11.4.1 *One Product Specified* 21
3.11.4.2 *Two or More Products Specified* 22
3.11.4.3 *Substitution Request Form* 22
3.11.4.4 *List of Manufacturers and Products Required* 22
3.11.5 Deferred Approvals 22
3.12 CUTTING AND PATCHING 23
3.12.1 Scope 23
3.12.2 Consent 23
3.12.3 Structural Members 23
3.12.4 Subsequent Removal 23
3.13 CLEANING UP 23
3.13.1 Contractor's Responsibility 23
3.13.2 Failure to Cleanup 24
3.13.3 Construction Buildings 24
3.14 ACCESS TO WORK 24
3.15 ROYALTIES AND PATENTS 24
3.15.1 Payment and Indemnity 24
3.15.2 Review 24
3.16 INDEMNIFICATION 24
3.16.1 Scope: Contractor 25
3.16.2 Scope: Subcontractors 25
3.16.2.1 *Indemnity* 25
3.16.2.2 *Joint and Several Liability* 26

3.16.3 No Limitation 26
3.17 OWNER AS INTENDED BENEFICIARY 26
3.18 NOTICE OF EXCUSE FOR NONPERFORMANCE 26
3.19 RECOVERY OF COSTS, DAMAGES, OR TIME EXTENSIONS FROM OWNER 27
3.20 USE OF FEDERAL FUNDS 27
ARTICLE 4 30
ADMINISTRATION OF THE CONTRACT 30
4.1 ARCHITECT 30
4.1.1 Definition 30
4.1.2 Modification 30
4.1.3 Termination 30
4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT 30
4.2.1 Status 30
4.2.2 Site Visits 30
4.2.3 Limitations of Construction Responsibility 31
4.2.4 Communications Facilitating Contract Administration 31
4.2.5 Payment Applications 31
4.2.6 Rejection of Work 31
4.2.7 Change Orders 31
4.2.8 Warranties Upon Completion 31
4.2.9 Interpretation 32
4.2.10 Additional Instructions 32
4.2.10.1 *Architect's Interpretations and Decisions* 32
4.2.10.2 *Typical Parts and Sections* 32
4.2.10.3 *Dimensions* 32
4.3 INSPECTOR OF RECORD 32
4.3.1 General 32
4.3.2 Inspector's of Record's Duties 33
4.3.3 Inspector of Record's Authority to Reject or Stop Work 33
4.3.4 Inspector of Record's Facilities 33
4.4 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE OWNER FOR PROFESSIONAL SERVICES 33
4.5 NOTICES OF POTENTIAL CHANGE, CHANGE ORDER REQUESTS, AND CLAIMS 34
4.5.1 Notice of Potential Change 34
4.5.2 Change Orders Requests 35
4.5.3 Definition of Claim 37
4.5.4 Time for Submitting Claim; Waiver 37
4.5.5 Content of Claim 38
4.5.5.1 *Claim Format; Waiver* 38
4.5.5.2 *Claims for Additional Money* 40
4.5.5.3 *Claims for Additional Time* 40
4.5.5.3.1 *Notice of Extent of Claim* 40
4.5.5.3.2 *Unusual and Uncommon Weather Claims* 41
4.5.5.4 *Subcontractor Requests for Money or Time* 41
4.5.6 Procedures for Claims (Public Contract Code section 9204) 42
4.5.6.1 *Claims* 42
4.5.6.2 *Meet and Confer* 42
4.5.6.3 *Government Code Claim* 43
4.5.7 Continuing Contract Performance 44
4.5.8 Claims for Concealed or Unknown Conditions 44
4.5.8.1 *Trenches or Excavations Less Than Four Feet Below the Surface* 44
4.5.8.2 *Trenches or Excavations Greater Than Four Feet Below the Surface* 44
4.5.9 Injury or Damage to Person or Property 45
ARTICLE 5 45
SUBCONTRACTORS 45
5.1 DEFINITIONS 45
5.1.1 Subcontractor 45
5.1.2 Sub-Subcontractor 46
5.1.3 Specialty Contractors 46

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK 46
5.2.1 Assignment or Substitution - Consent of Owner 46
5.2.2 Grounds for Substitution 46
5.2.2.1 *No Change in Contract* 47
5.2.2.2 *Substitution Due to Clerical Error* 47
5.3 SUBCONTRACTUAL RELATIONS 48
5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS 48
5.5 SUBCONTRACTOR'S RESPONSIBILITIES 49
5.5.1 Supervision by Subcontractors 49
5.5.2 Discipline and Order 49
5.5.3 Defects Discovered 49
5.5.4 Subcontractor Information 49
5.5.5 Temporary Structures 50
5.5.6 Charges to Subcontractor 50
5.5.7 Fines Imposed 50
5.5.8 Project Signs 50
5.5.9 Remedies for Failure to Perform 50
5.5.10 Disputes Not to Affect Work 51
5.5.11 Application for Payment 51
5.5.12 Compliance with Procedures 51
5.5.13 On-Site Record Keeping 51
5.5.14 Non-Exclusive Obligations 51
ARTICLE 6 52
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS 52
6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS 52
6.1.1 Owner's Rights 52
6.1.2 Designation as Contractor 52
6.1.3 Contractor Duties 52
6.1.4 Owner Obligations 52
6.2 MUTUAL RESPONSIBILITY 52
6.2.1 Delivery and Storage 52
6.2.2 Notice by Contractor 53
6.2.3 Costs Incurred 53
6.2.4 Correction of Damage 53
6.3 OWNER'S RIGHT TO CLEAN UP 53
ARTICLE 7 53
CHANGES IN THE WORK 53
7.1 CHANGES 53
7.1.1 No Changes Without Authorization 53
7.1.2 Authority to Order Minor Changes 54
7.2 CHANGE ORDERS 54
7.3 CONSTRUCTION CHANGE DIRECTIVES ("CCD") 55
7.3.1 Definition 55
7.3.2 Use to Direct Change 55
7.4 REQUEST FOR INFORMATION ("RFI") 55
7.4.1 Definition 55
7.4.2 Scope 56
7.4.3 Response Time 56
7.4.4 Costs Incurred 56
7.5 REQUEST FOR PROPOSAL ("RFP") 56
7.5.1 Definition 56
7.5.2 Scope 57
7.6 CHANGE ORDER REQUEST ("COR") 57
7.6.1 Definition 57
7.6.2 Changes in Price 57
7.6.3 Changes in Time 57
7.7 PRICE OF CHANGE ORDERS 57
7.7.1 Scope 57
7.7.2 Determination of Cost 57
7.7.3 Format for Proposed Cost Change 60
7.7.4 Discounts, Rebates, and Refunds 61
7.7.5 Accounting Records 61
7.7.6 Notice Required 61
7.7.7 Applicability to Subcontractors 61
7.8 Waiver of Right to Claim Money or Time 61
ARTICLE 8 62

TIME 62
8.1 DEFINITIONS 62
8.1.1 Contract Time 62
8.1.2 Notice to Proceed 62
8.1.3 Days 62
8.2 HOURS OF WORK 62
8.2.1 Sufficient Forces 62
8.2.2 Performance During Working Hours 62
8.2.3 Labor Code Application 62
8.2.4 Costs for After Hours Inspections 63
8.2.5 Time for Commencement By Subcontractors 63
8.3 PROGRESS AND COMPLETION 63
8.3.1 Time of the Essence 63
8.3.2 No Commencement Without Insurance 64
8.3.3 Expeditious Completion 64
8.4 EXTENSIONS OF TIME - LIQUIDATED DAMAGES 64
8.4.1 Conditions Allowing for Extensions of Time to Complete the Work Only (Excusable Delay) 64
8.4.2 Compensable Delay (Time and Money) 65
8.4.3 Notice by Contractor Required; Procedures for Demanding Additional Time or Money 65
8.4.4 Early Completion 65
8.4.5 Liquidated Damages 65
8.5 Government Approvals 66
ARTICLE 9 66
PAYMENTS AND COMPLETION 66
9.1 CONTRACT SUM 66
9.2 COST BREAKDOWN 66
9.2.1 Required Information 66
9.2.2 Owner Acceptance Required 67
9.3 APPLICATIONS FOR PAYMENT 67
9.3.1 Procedure 67
9.3.2 Purchase of Materials and Equipment 68
9.3.3 Warranty of Title 68
9.4 REVIEW OF PROGRESS PAYMENT 69
9.4.1 Owner Acceptance 69
9.4.2 Owner's Review 69
9.5 DECISIONS TO WITHHOLD PAYMENT 70
9.5.1 Reasons to Withhold Payment 70
9.5.2 Payment After Cure 72
9.5.3 Overpayment and/or Failure to Withhold 72
9.6 PROGRESS PAYMENTS 72
9.6.1 Payments to Contractor 72
9.6.2 Payments to Subcontractors 73
9.6.3 Percentage of Completion or Payment Information 73
9.6.4 No Obligation of Owner for Subcontractor Payment 73
9.6.5 Payment to Suppliers 73
9.6.6 Payment Not Constituting Approval or Acceptance 73
9.6.7 Joint Checks 73
9.7 COMPLETION OF THE WORK 74
9.7.1 Close-Out Procedures 74
9.7.2 Costs of Multiple Inspections 74
9.8 PARTIAL OCCUPANCY OR USE 74
9.9 FINAL PROGRESS PAYMENT AND RELEASE OF RETENTION 75
9.9.1 Final Application for Progress Payment 75
9.9.2 Procedures for Application for Final Progress Payment 75
9.9.3 Release of Retainage 76
9.10 SUBSTITUTION OF SECURITIES 76
ARTICLE 10 77
PROTECTION OF PERSONS AND PROPERTY 77
10.1 SAFETY PRECAUTIONS AND PROGRAMS 77
10.1.1 Contractor Responsibility 77
10.1.2 Subcontractor Responsibility 77

10.1.3 Cooperation 78
10.1.4 Accident Reports 78
10.1.5 First-Aid Supplies at Site 78
10.2 SAFETY OF PERSONS AND PROPERTY 78
10.2.1 The Contractor 78
10.2.2 Contractor Notices 78
10.2.3 Safety Barriers and Safeguards 78
10.2.4 Use or Storage of Hazardous Material 79
10.2.5 Fingerprinting 79
10.3 PROTECTION OF WORK AND PROPERTY 79
10.3.1 Protection of Work 79
10.3.2 Protection for Elements 79
10.3.3 Shoring and Structural Loading 79
10.3.4 Conformance Within Established Limits 80
10.3.5 Subcontractor Enforcement of Rules 80
10.3.6 Site Access 80
10.3.7 Protection of Materials 80
10.4 EMERGENCIES 80
10.4.1 Emergency Action 80
10.4.2 Accident Reports 81
10.5 HAZARDOUS MATERIALS 81
10.5.1 Discovery of Hazardous Materials 81
10.5.2 Hazardous Material Work Limitations 81
10.5.3 Indemnification By Owner for Hazardous Material Not Caused by Contractor 81
10.5.4 Naturally Occuring Asbestos 82
10.5.4 Indemnification by Contractor for Hazardous Material Caused by Contractor 82
10.5.5 Terms of Hazardous Material Provision 82
10.5.6 Archeological Materials 82
ARTICLE 11 83
INSURANCE AND BONDS 83
11.1 CONTRACTOR'S LIABILITY INSURANCE 83
11.1.1 Liability Insurance Requirements 83
11.1.2 Subcontractor Insurance Requirements 84
11.1.3 Owner's Insurance 84
11.1.4 Additional Insured Endorsement Requirements 84
11.1.5 Workers' Compensation Insurance 84
11.1.6 Builder's Risk/ 85
11.1.6.1 Course-of-Construction Insurance Requirements 85
11.1.7 Consent of Insurer for Partial Occupancy or Use 86
11.1.8 Fire Insurance 86
11.1.9 Other Insurance 86
11.1.10 Proof of Carriage of Insurance 87
11.1.11 Compliance 87
11.2 PERFORMANCE AND PAYMENT BONDS 87
11.2.1 Bond Requirements 87
11.2.2 Surety Qualification 88
ARTICLE 12 88
UNCOVERING AND CORRECTION OF WORK 88
12.1 UNCOVERING OF WORK 88
12.1.1 Uncovering Work for Required Inspections 88
12.1.2 Costs for Inspections not Required 88
12.2 CORRECTION OF WORK; WARRANTY 89
12.2.1 Correction of Rejected Work 89
12.2.2 Removal of Nonconforming Work 89
12.2.3 Owner's Rights if Contractor Fails to Correct 89
12.2.4 Cost of Correcting the Work 89
12.2.5 Warranty Corrections 89
12.2.6 No Time Limitation 90
12.3 NONCONFORMING WORK 90

ARTICLE 13 90
MISCELLANEOUS PROVISIONS 90
13.1 GOVERNING LAW 90
13.2 SUCCESSORS AND ASSIGNS 90
13.3 WRITTEN NOTICE 91
13.4 RIGHTS AND REMEDIES 91
13.4.1 Duties and Obligations Cumulative 91
13.4.2 No Waiver 91
13.5 TESTS AND INSPECTIONS 91
13.5.1 Compliance 91
13.5.2 Independent Testing Laboratory 91
13.5.3 Advance Notice to Inspector of Record 92
13.5.4 Testing Off-Site 92
13.5.5 Additional Testing or Inspection 92
13.5.6 Costs for Retesting 92
13.5.7 Costs for Premature Test 92
13.5.8 Tests or Inspections Not to Delay Work 92
13.6 [INTENTIONALLY LEFT BLANK] 93
13.7 TRENCH EXCAVATION 93
13.7.1 Trenches Greater Than Five Feet 93
13.7.2 Excavation Safety 93
13.7.3 No Tort Liability of Owner 93
13.7.4 No Excavation Without Permits 93
13.8 WAGE RATES 93
13.8.1 Wage Rates 93
13.8.2 Holiday and Overtime Pay 94
13.8.3 Wage Rates Not Affected by Subcontracts 94
13.8.4 Change in Prevailing Wage During Bid or Construction 94
13.8.5 Forfeiture and Payments 94
13.8.6 Minimum Wage Rates 94
13.8.7 Per Diem Wages 95
13.8.8 **Posting of Wage Rates** 95
13.9 RECORD OF WAGES PAID: INSPECTION 95
13.9.1 Application of Labor Code 95
13.10 APPRENTICES 97
13.10.1 Apprentice Wages and Definitions 97
13.10.2 Apprentice Labor Pool 97
13.10.3 Journeyman/Apprentice Ratio; Computation of Hours 98
13.10.4 Journeyman/Apprentice Ratio 98
13.10.4.1 *Apprenticeable Craft or Trade* 99
13.10.5 Ratio Exemption 99
13.10.6 Apprentice Fund 99
13.10.7 Prime Contractor Compliance 100
13.10.8 Decisions of Joint Apprenticeship Committee 100
13.10.9 No Bias 100
13.10.10 Violation of Labor Code 100
13.11 ASSIGNMENT OF ANTITRUST CLAIMS 101
13.11.1 Application 101
13.11.2 Assignment of Claim 101
13.12 AUDIT 101
13.13 STORM WATER DISCHARGE PERMIT 102
ARTICLE 14 102
TERMINATION OR SUSPENSION OF THE CONTRACT 102
14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE 102
14.2 TERMINATION BY THE OWNER FOR CAUSE 102
14.2.1 Grounds for Termination 102
14.2.2 Notification of Termination 103
14.2.3 Payments 103
14.2.4 Wrongful Termination 104
14.2.5 Inclusion of Termination for Convenience 104
14.3 SUSPENSION OR TERMINATION BY THE OWNER FOR CONVENIENCE 104
14.3.1 Suspension by Owner 104
14.3.1.1 *Adjustments* 104
14.3.1.2 *Adjustments for Fixed Cost* 104

14.3.2 Termination by the Owner for Convenience 104
14.4 NOT A WAIVER 105
14.5 MUTUAL TERMINATION FOR CONVENIENCE 105
14.6 EARLY TERMINATION 105

ARTICLE 1

GENERAL CONDITIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The "Contract Documents" consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to bid, Instructions to Bidders, Notice to Bidders, the Bid Form, Payment Bond, Performance Bond, required insurance certificates, additional insured endorsement and declarations page, Designation of Subcontractors, Noncollusion Declaration, Sufficient Funds Declaration (Labor Code section 2810), the Fingerprinting Notice and Acknowledgment and Independent Contractor Student Contact Form, other documents referred to in the Agreement, and Modifications issued after execution of the Agreement. A Modification is a written amendment to the Contract signed by both parties, a Change Order, a Construction Change Directive, or a written order for a minor change in the Work issued by the Owner. The Contract Documents are complementary, and each obligation of the Contractor, Subcontractors, material or equipment suppliers in any one shall be binding as if specified in all.

1.1.2 THE CONTRACT

The Contract Documents form the Contract. The "Contract" represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the Owner and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the Owner and the Contractor. The terms of the Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever except by written agreement signed by the parties and approved or ratified by the Owner's governing board.

1.1.3 THE WORK

The "Work" shall include all labor, materials, services and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents, including but not limited to punch list items and submission of documents. It shall include the initial obligation of any Contractor or Subcontractor, who performs any portion of the Work, to visit the Site of the proposed Work with Owner's representatives, a continuing obligation after the commencement of the Work to fully acquaint and familiarize itself with the conditions as they exist and the

character of the operations to be carried on under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor or Subcontractor shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated bid documents. The "Site" refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work.

1.1.4 THE PROJECT

The "Project" is the total construction of the Work performed in accordance with the Contract Documents, but "Project" may also include construction by the Owner or by separate contractors of improvements related to, but not included in, the Work. The Project shall constitute a "work of improvement" under Civil Code section 8050 and Public Contract Code section 7107.

1.1.5 THE DRAWINGS

The "Drawings" are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect.

1.1.6 THE SPECIFICATIONS

The "Specifications" are that portion of the Contract Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

1.1.7 THE PROJECT MANUAL

The "Project Manual" is the volume usually assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Agreement, Conditions of the Contract, and Specifications.

1.1.8 OR

"Or" shall include "and/or."

1.1.9 COMPLETION

Statutory definitions of "Completion" and "Complete" shall apply for those statutory purposes. For all other purposes, including accrual of liquidated damages, Claims, and warranties, "Completion" and "Complete" mean the point in the Work where (1) Contractor has fully and correctly performed all Work in all parts and requirements, including corrective and punch list

work, and (2) Owner's representatives have conducted a final inspection that confirmed this performance. Substantial, or any other form of partial or non-compliant, performance shall not constitute "Completion" or "Complete" under the Contract Documents, except to the extent that substantial completion is required for a milestone deadline.

1.1.10 COMPLETION OF THE PROJECT

For purposes of accrual of liquidated damages for delay to the Project, *completion* shall mean the point in the Project where (1) all contractors and Owner have fully and correctly performed all work of the entire Project in all parts and requirements, including corrective and punch list work, and (2) Owner's representatives have conducted a final inspection of the entire Project that confirmed this performance. Substantial, or any other form of partial or non-compliant, performance shall not constitute *completion* or *complete*.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 CORRELATION AND INTENT

1.2.1.1 ***Documents Complementary and Inclusive.*** The Contract Documents are complementary and are intended to include all items required for the proper execution and Completion of the Work. Any item of Work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both.

1.2.1.2 ***Coverage of the Drawings and Specifications.*** The Drawings and Specifications generally describe the work to be performed by Contractor. Generally, the Specifications describe work which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown. All materials or labor for Work, which is shown on the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to Complete the Work), shall be provided by the Contractor whether or not the Work is expressly covered in the Drawings or the Specifications. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by Contractor.

1.2.1.3 ***Conflicts.*** Without limiting Contractor's obligation to identify conflicts for resolution by the Owner, in the event of a conflict between provisions of the Contract Documents, it is intended that the more stringent, higher quality, and greater quantity of Work shall apply; except that in the event of a conflict between a Division 01 specification and a

provision in a Division 00 Contract Document (such as the agreement, general conditions, notice to bidders, instructions to bidders, bid form, etc.), the Division 00 provision shall control.

1.2.1.4 ***Conformance With Laws.*** Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party the Contract shall be amended in writing to make such insertion or correction.

Before commencing any portion of the Work, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with any such restrictions or special requirements of the Contract Documents, Contractor shall promptly notify Architect and Owner in writing of same and shall ensure that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Work. Where requirements of the Contract Documents exceed those of the applicable building codes and ordinances, the Contract Documents shall govern. Contractor shall comply with all applicable Federal, State and local laws.

If, as and to the extent that Public Contract Code section 1104 is deemed to apply after the award of the Contract, Contractor shall not be required to assume responsibility for the completeness and accuracy of architectural or engineering plans and specifications, notwithstanding any other provision in the Contract Documents, except to the extent that Contractor discovered or should have discovered and reported any errors and omissions to the Architect and Owner, including but not limited to as the result of any review of the plans and specifications by Contractor required by the Instructions to Bidders or other Contract Documents, whether or not actually performed by Contractor.

1.2.1.5 ***Ambiguity.*** Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify Architect and Owner in writing of any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Sum or the time for performance. If

Contractor performs, permits, or causes the performance of any Work under the Contract Documents prepared by or on behalf of Contractor which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction, without increase to or adjustment in the Contract Sum or the time for performance. In no case shall any Subcontractor proceed with the Work if uncertain without the Contractor's written direction and/or approval.

1.2.1.6 ***Execution.*** Execution of the Agreement Between Owner and Contractor by the Contractor is a representation that the Contractor has visited the Site, become familiar with the local conditions under which the Work is to be performed and has correlated personal observations with the requirements of the Contract Documents.

1.2.2 **Addenda and Deferred Approvals**

1.2.2.1 ***Addenda.*** Subsequent addenda issued shall govern over prior addenda only to the extent specified. In accordance with Title 24, California Code of Regulations, addenda shall be approved by the Division of the State Architect ("DSA").

1.2.2.2 ***Deferred Approvals.*** The requirements approved by the DSA on any item submitted as a deferred approval in accordance with Title 24, California Code of Regulations, shall take precedence over any previously issued addenda, drawing or specification.

1.2.3 **Specification Interpretation**

1.2.3.1 ***Titles.*** The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of work to be performed by any trade.

1.2.3.2 ***As Shown, Etc.*** Where "as shown," "as indicated," "as detailed," or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where "as directed," "as required," "as permitted," "as authorized," "as accepted," "as selected," or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.

1.2.3.3 ***Provide.*** "Provide" means "provided complete in place," that is, furnished, installed, tested, and ready for operation and use.

1.2.3.4 ***General Conditions.*** The General Conditions and any supplementary general conditions are a part of each and every section of the Specifications.

1.2.3.5 ***Abbreviations.*** In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as “Contractor shall,” “shall be,” etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a “note” occurs on the Drawings.

1.2.3.6 ***Plural.*** Words in the singular shall include the plural whenever applicable or the context so indicates.

1.2.3.7 ***Metric.*** The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1” (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the “International System of Units” (SI) and generally follow ASTM E 380, “Standard for Metric Practice.”

1.2.3.8 ***Standard Specifications.*** Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization’s standard specifications, which are in effect as of the date the Notice to Bidders is first published. If applicable specifications are revised prior to completion of any part of the Work, the Contractor may, if acceptable to Owner and Architect, perform such Work in accordance with the revised specifications. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.

1.2.3.9 ***Absence of Modifiers.*** In the interest of brevity, the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.3 OWNERSHIP AND USE OF ARCHITECT’S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

The Drawings, Specifications, and other documents prepared on behalf of the Owner are instruments of the services of the Architect and its consultants and are the property of the Owner. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them. All copies of them, except the Contractor’s record set, shall be returned or suitably accounted for to the Owner, upon request upon Completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Contract. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other contracts or

projects or for additions to this Contract or Project outside the scope of the Work without the specific written consent of the Owner and the Architect. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's property interest or other reserved right. All copies made under this license shall bear appropriate attribution and the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect.

ARTICLE 2

OWNER

2.1 DEFINITION

The term "Owner" means the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner and/or the Owner's authorized representatives, including but not limited to architects and construction managers. To the extent the Contract Documents indicate that Owner has assigned duties to particular representatives of the Owner (such as the Architect, or any construction manager), Owner reserves the right at all times to reassign such duties to different Owner representatives.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 Intentionally Left Blank

2.2.2 Site Survey

When required by the scope of the Work, the Owner will furnish, at its expense, a legal description or a land survey of the Site, giving, as applicable, grades and lines of streets, alleys, pavements, adjoining property, rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries, and contours of the Site. Surveys to determine locations of construction, grading, and Site work shall be provided by the Contractor.

2.2.3 Soils

2.2.3.1 ***Owner Furnished Services.*** When required by the scope of the Project, the Owner will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required or as required by local or state codes. Such services with reports and appropriate professional recommendations shall include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests,

including necessary operations for determining subsoil, air, and water conditions.

2.2.3.2 ***Contractor Reliance.*** Test borings and soils reports for the Project have been made for the Owner to indicate the subsurface materials that might be encountered at particular locations on the Project. The Owner has made these documents available to the Contractor and the Contractor has studied the results of such test borings and information that it has as to the subsurface conditions and Site geology as set forth in the test borings and soils reports. The Owner does not assume any responsibility whatsoever with respect to the sufficiency or accuracy of the borings made, or of the logs of the test borings, or of other investigations, or of the soils reports furnished pursuant hereto, or of the interpretations to be made beyond the location or depth of the borings. There is no warranty or guarantee, either express or implied that the conditions indicated by such investigations, borings, logs, soil reports or other information are representative of those existing throughout the Site of the Project, or any part thereof, or that unforeseen developments may not occur. At the Owner's request, the Contractor shall make available to the Owner the results of any Site investigation, test borings, analyses, studies or other tests conducted by or in the possession of the Contractor of any of its agents. Nothing herein contained shall be deemed a waiver by the Contractor to pursue any available legal right or remedy it may have at any time against any third party who may have prepared any report and/or test relied upon by the Contractor.

2.2.4 Utility Survey

When required by the scope of the Project, the Owner will furnish, at its expense, all information regarding known existing utilities on or adjacent to the Site, including location, size, inverts, and depths.

2.2.5 Information

Upon the request of the Contractor, Owner will make available such existing information regarding utility services and Site features, including existing construction, related to the Project as is available from Owner's records. The Contractor may not rely upon the accuracy of any such information, other than that provided under Sections 2.2.2 and 2.2.4 (except that the Contractor may not rely upon, and must question in writing to the Owner and the Architect, any information which appears incorrect based upon Contractor's Site inspection, knowledge of the Work and Project, and prior experience with similar projects), unless specifically stated in writing that the Contractor may rely upon the designated information.

2.2.6 Existing Utility Lines; Removal, Relocation

2.2.6.1 ***Removal, Relocation.*** Pursuant to Government Code section 4215, the Owner assumes the responsibility for removal, relocation, and protection of utilities located on the Site at the time of commencement of construction under this Contract with respect to any such utility facilities which are not identified in the drawings and specifications made part of the invitation to bid. The Contractor shall not be assessed for liquidated damages for delay in

Completion of the Work caused by failure of the Owner to provide for removal or relocation of such utility facilities. Owner shall compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, removing or relocating such utility facilities, and for equipment necessarily idle during such work.

2.2.6.2 ***Assessment.*** These subparagraphs shall not be construed to preclude assessment against the Contractor for any other delays in Completion of the Work. Nothing in these subparagraphs shall be deemed to require the Owner to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site.

2.2.6.3 ***Notification.*** If the Contractor, while performing work under this Contract, discovers utility facilities not identified by the Owner in the Contract plans or specifications, Contractor shall immediately notify the Owner and the utility in writing.

2.2.6.4 ***Underground Utility Clearance.*** It shall be Contractor's sole responsibility to timely notify all public and private utilities serving the Site prior to commencing work. The Contractor shall notify and receive clearance from any cooperative agency, such as Underground Service Alert, in accordance with Government Code section 4216, et seq. Contractor shall promptly provide a copy of all such notifications to the Owner.

2.2.7 Easements

Owner shall secure and pay for easements for permanent structures or permanent changes in existing facilities, if any, unless otherwise specified in the Contract or Contract Documents.

2.2.8 Reasonable Promptness

Information or services under Owner's control will be furnished by the Owner with reasonable promptness.

2.2.9 Copies Furnished

The Contractor will be furnished such copies of Drawings and Project Manuals as are stated in the Contract Documents.

2.2.10 Duties Cumulative

The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein, and especially those in Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion), and Article 11 (Insurance and Bonds).

2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may order the Contractor to stop the Work or any portion thereof, until the Contractor corrects the deficiencies. Contractor shall not be entitled to a time extension for any delays caused by such order. The right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Article 6.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor fails or refuses to carry out the Work in accordance with the Contract Documents, Owner may correct such deficiencies by whatever reasonable method the Owner may deem expedient without prejudice to other remedies the Owner may have, including but not limited to having another contractor perform some or all of the Work without terminating the Contract with Contractor. Owner may exercise this right at any time during the Contractor's Work.

Owner shall first provide written notice to Contractor of Contractor's failure or refusal to perform. The notice will provide the time period within which Contractor must begin correction of the failure or refusal to perform. If the Contractor fails to begin correction within the stated time, or fails to continue correction, the Owner may proceed to correct the deficiencies. In the event the Owner bids the work, Contractor shall not be eligible for the award of the contract. The Contractor may be invoiced the cost to Owner of the work, including compensation for additional professional and internally generated services and expenses made necessary by Contractor's failure or refusal to perform. Owner may withhold that amount from the retention, or progress payments due the Contractor, pursuant to Section 9.5. If retention and payments withheld then or thereafter due the Contractor are not sufficient to cover that amount, the Contractor shall pay the difference to the Owner.

ARTICLE 3

THE CONTRACTOR

3.1 DEFINITION

The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative. To the extent that any portion of the Work is provided with the Contractor's own forces, any reference to Subcontractors shall be equally applicable to the Contractor.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 Contractor

The Contractor shall supervise and direct the Work using the Contractor's best skill and attention, which shall meet or exceed the standards in the industry. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures, and coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters. The Contractor shall perform the Work in a workmanlike manner, in compliance with the Contract Documents, and in compliance with all applicable local, state, and federal codes, regulations, and other law.

If part of the Project is performed by other contractors that Owner directly retains, Owner shall schedule and coordinate the activities of Contractor with the other contractors. Contractor agrees to accept the Owner's construction schedules, schedule updates, overall sequence and coordination of construction for the Project.

Contractor realizes that work by other contractors or Owner may occur simultaneously with Contractor's Work in any given area. Contractor is responsible for its own sequences that may occur within a given activity or set of activities. Contractor shall not commit or permit any act which will adversely affect the work of any other contractor or Owner. Contractor shall provide layout of its Work at the request of any other contractor or Owner.

Specific duties of the Contractor shall be in accordance with Title 24 of the California Code of Regulations. Contractor shall fully comply with any and all reporting requirements of Education Code sections 17309 and 81141 in the manner prescribed by Title 24.

3.2.2 Contractor Responsibility

The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with the Contractor or any of its Subcontractors.

3.2.3 Obligations not Changed by OTHERs' Actions

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by the activities or duties of the Owner's representatives, including but not limited to any construction manager and the Architect, or the Inspector of Record; or by tests, inspections, or approvals required or performed by persons other than the Contractor.

3.2.4 Contractor Responsibility for Readiness for Work

The Contractor shall be responsible for inspection of Work already performed under the

Contract Documents to determine that such portions are in proper condition to receive subsequent work.

3.2.5 Project Meetings

During its Work, Contractor shall attend Owner's Project meetings as scheduled by the Contract Documents, or as otherwise instructed by Owner, to discuss the current status of the Work and Project, and the future progress of the Work and the Project. Contractor shall have five (5) days after receipt of Owner's Project meeting minutes to provide written objections and suggested corrections. Either party may audio record any meeting related to the Contract.

3.3 SUPERINTENDENT

3.3.1 Full Time Superintendent

The Contractor shall provide a competent superintendent and assistants as necessary, all of whom shall be reasonably proficient in speaking, reading and writing English and, who shall be in attendance at the Project Site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

3.3.2 Staff

The Contractor and each Subcontractor shall: furnish a competent and adequate staff as necessary for the proper administration, coordination, supervision, and superintendence of its portion of the Work; organize the procurement of all materials and equipment so that the materials and equipment will be available at the time they are needed for the Work; and keep an adequate force of skilled workers on the job to Complete the Work in accordance with all requirements of the Contract Documents.

3.3.3 Right to Remove

Owner shall have the right, but not the obligation, to require the removal from the Project of any superintendent, staff member, agent, or employee of any Contractor, Subcontractor, material or equipment supplier, etc., for cause.

3.4 LABOR AND MATERIALS

3.4.1 Contractor to Provide

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, material, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and Completion of the Work whether temporary or permanent, and such facilities, labor, equipment, material,

and services are included in the Work. Owner shall not be liable for, and Contractor shall bear the burden of, any post-bid escalation in the cost of materials; but Contractor will retain the benefit of any post-bid material cost decreases. Owner shall have no responsibility for security of, or repair or replacement costs of, such facilities, labor, equipment, material, and services provided by Contractor pursuant to this subsection.

3.4.2 QUALITY

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of such quality as required to satisfy the standards of the Contract Documents. The Contractor shall, if requested, promptly furnish satisfactory evidence as to kind and quality of all materials and equipment. All labor shall be performed by workers skilled in their respective trades, and the quality of their work shall meet whichever is the higher standard for their work: the standard in the industry or the standard in the Contract Documents.

3.4.3 REPLACEMENT

Any work, materials, or equipment, which does not conform to these standards may be disapproved and rejected by the Owner, in which case, they shall be removed and replaced by the Contractor at no cost to the Owner.

3.4.4 DISCIPLINE

The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract in accordance with paragraph 5.5.1 including, but not limited to, Subcontractors, and material or equipment suppliers retained for the Project.

3.5 WARRANTY

For the period of one (1) year after Completion of the Work (see Sections 9.7.1, 12.2.5, and 12.2.6), the Contractor warrants to the Owner that material and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty does not cover damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.6 TAXES

Contractor will pay all applicable Federal, State, and local taxes on all materials, labor, or

services furnished by it, and all taxes arising out of its operations under the Contract Documents. Owner is exempt from Federal Excise Tax, and a Certificate of Exemption shall be provided upon request.

3.7 PERMITS, FEES AND NOTICES

3.7.1 Payment

The Contractor shall secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and Completion of the Work which are customarily secured, or required by the Contract or law to be secured, after execution of the Contract, and which are legally required from any authority having jurisdiction over the Project, except those required from the Division of the State Architect (DSA). Owner shall be responsible for all testing and inspection as required by the DSA on-Site or within the distance limitations set forth in paragraph 13.5.2, unless a different mileage range is specified in the Contract Documents.

3.7.2 Compliance

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work.

3.7.3 Contract Documents

It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with any applicable law, statute, ordinance, building codes, rule, or regulation. However, if the Contractor knew, or should have known, or observes that portions of the Contract Document are at variance therewith, the Contractor shall promptly notify the Architect, any construction manager, and Owner in writing, and necessary changes shall be accomplished by appropriate modification.

3.7.4 Responsibility

If the Contractor performs any work that it knows, or should have known, is contrary to any law, statute, ordinance, building code, rule or regulation, the Contractor shall assume full responsibility for such work, and shall bear the attributable cost of correction and delays to the Work, other contractors' work, and the Project.

3.8 ALLOWANCES

3.8.1 Contract

The Contractor shall include in the Contract Sum all allowances, including any general contingency allowance, stated in the Contract Documents. Items covered by specific allowances shall be supplied for such amounts and by such persons or entities as the Owner

may direct, but the Contractor shall not be required to employ persons or entities against whom the Contractor makes reasonable and timely objection.

3.8.2 **SCOPE**

3.8.2.1 ***Prompt Selection.*** Materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay to the Work.

3.8.2.2 ***Cost.*** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the Site and all required taxes, less applicable trade discounts, etc., as delineated in paragraph 7.7.4.

3.8.2.3 ***Cost Included in Contract Sum.*** Contractor's costs for unloading and handling at the Site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances.

3.8.2.4 ***Contract Sum Adjustment.*** Whenever Contractor seeks payment from an allowance and the requested costs are approved by Owner as compliant with the Contract Documents (including Sections 3.8.2.2 and 3.8.2.3, above), Owner may elect to pay the approved costs from the allowance, or pay the costs via Change Order. Any such allowance payment shall conform to the requirements of the Agreement and other Contract Documents.

3.9 **CONTRACTOR'S CONSTRUCTION SCHEDULES**

3.9.1 **REQUIREMENTS**

Before the Contractor's commencement of Work or within two (2) weeks of award of the Contract, whichever is earlier, Contractor shall prepare and submit for the Owner's, and any construction manager's, information the baseline construction schedule for the Work, which shall conform to the Contract Documents' requirements ("Baseline Schedule").

Contractor shall submit an updated schedule for the Work by the first day of every month, and whenever else requested by the Owner ("Schedule Update"). Each Schedule Update must include accurate as-built dates and the current as-planned schedule, both of which shall conform to the Contract Documents' requirements. Contractor shall submit its daily logs for the prior month with each Schedule Update. The Schedule Update shall be submitted regardless of whether other Schedule Updates have previously been submitted. Submission of a short-term schedule (such as a "three-week look-ahead" schedule) is not a valid substitute for submitting a Schedule Update.

The Baseline Schedule and all Schedule Updates shall conform, at a minimum, to industry standards for (a) critical path method scheduling and (b) facilitation of Owner's Project management and evaluation of Contractor Claims for additional money or time.

The Baseline Schedule and all Schedule Updates shall not exceed time limits (including milestone deadlines) under the Contract Documents and shall comply with the Contract Documents scheduling requirements and with any scheduling requirements the Owner provides to the Contractor at the beginning of the Work. The Baseline Schedule and all Schedule Updates shall accurately reflect Work performed to date; reasonable dates for future Work; all construction activities (including procurement); the critical path for Completion of the remainder of the Work; the logic, sequencing, and relationship between the construction activities, including each activity's predecessor and successor activities; and the percentage of the Work completed.

The Baseline Schedule and all Schedule Updates shall include a reasonable number of days for weather that is usual or common for each month, as time extensions are not available for such days (see Sections 4.5.5.3.2 and 8.4.1, below); and any failure by Contractor to include a reasonable number of such days, or by Owner to require Contractor to include a reasonable number of such days, shall not affect the reasonable number of such days to be used when determining time extensions under Sections 4.5.5.3.2 and 8.4.1, below.

The Baseline Schedule and all Schedule Updates shall include a reasonable number of days for usual or common delays by utility companies, and for usual or common delays by other government agencies.

The Baseline Schedule and all Schedule Updates shall be in the form of either a tabulation, chart, or graph, and shall be in sufficient detail to show the chronological relationship of all activities of the Work including, but not limited to, estimated starting and completion dates of various activities, (including early and late dates and reasonable float for each activity), procurement of materials, the critical path, and scheduling of equipment. Float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity durations, or imposed dates shall be apportioned for the benefit of the Work.

Whenever in the Contract Documents Contractor is required to provide a Baseline Schedule and/or a Schedule Update, the Contractor shall provide it in native electronic format as well as hard copy.

Contractor shall be solely responsible for the accuracy, utility and reasonableness of the Baseline Schedule and all Schedule Updates. Owner's acceptance, approval or non-rejection of Contractor's schedules shall not affect Contractor's responsibility for its schedules.

The Contractor and Owner shall use any float on a "first come, first served" basis. The Baseline Schedule and all Schedule Updates shall reflect Contractor's and Owner's use of float. Float is not for the exclusive use or benefit of either Owner or Contractor, but it is a jointly owned expiring Work resource available to both parties as needed to meet schedule milestones. For the Baseline Schedule and all Schedule Updates, Contractor shall use a critical path network format with the critical paths clearly indicated. Contractor shall use an MS Project, Primavera, or an equivalent or better program. Contractor shall include reports that sort and list the activities in order of increasing float and by early and late start dates. Contractor shall endeavor to label ten to thirty percent (10-30%) of the tasks as critical, but shall not label less than five (5%) or more than fifty (50%) as critical. Contractor shall use calendar days.

If any change in Contractor's method of operations will cause a change in the Baseline Schedule or most recent Schedule Update, Contractor shall submit to Owner, Architect, and any construction manager, another Schedule Update within seven (7) days of the change.

If in the Owner's opinion the Contractor is not prosecuting the Work at a rate sufficient to meet the Baseline Schedule, a Schedule Update, or a contractual milestone, or sufficient to Complete the Work within the Contract Time as adjusted by change orders, or if in the Owner's opinion the Contractor's actual progress falls behind the Baseline Schedule or a Schedule Update, Contractor will not meet a contractual milestone, or Contractor will not Complete the Work within the Contract Time as adjusted by change orders, then the Owner may require that the Contractor prepare and submit a recovery plan (including but not limited to any necessary acceleration). Contractor must submit a recovery plan within seven (7) days of a demand for the recovery plan. At a minimum, the recovery plan must include a proposed schedule that shows Completion of the Work by the contractual milestones and within the Contract Time, as adjusted by change orders, or Completion by other dates Owner specifies in the demand for a recovery plan. The recovery plan shall state the corrective actions Contractor will undertake to implement it. The recovery plan shall also list any additional money that Contractor believes it should receive if Owner orders Contractor to fully or partially implement the recovery plan. If the Owner specifically orders Contractor in writing to implement the recovery plan (including but not limited to acceleration), Contractor shall do so, but the order shall not act constitute an admission by Owner that Contractor is entitled to additional money for implementing the recovery plan. To recover additional money for implementing the recovery plan, Contractor must comply with Section 4.5 and Articles 7 and 8 below. If Contractor elects to implement a recovery plan or otherwise accelerate the Work without a specific written order from the Owner to do so, then Contractor waives all rights to recover additional money for implementing that recovery plan or accelerating.

The Baseline Schedule and all Schedules Updates shall be certified by Contractor as true and correct, as follows:

I, _____ *[name of declarant]*, declare the following:

_____ *[Contractor company name]* has contracted with _____ *[public entity name]* for the _____ Contract ("Contract"). _____ *[Contractor company name]* authorized me to prepare schedules for _____ *[public entity name]* for this Project, and I prepared the attached schedule. I am the most knowledgeable person at _____ *[Contractor company name]* regarding the scheduling of the Work for this Contract.

The attached schedule complies with the Contract Documents (including but not limited to General Conditions section 3.9.1), and is submitted in compliance with all laws applicable to submission of a Claim, including but not limited to California Penal Code section 72 (Fraudulent Claims), Government Code sections 12650 et seq. (False Claims Act; for example, Government Code section 12651(a)(7)), and Business and Professions Code sections 17200 et seq. (Unfair Business Practices Act). I am aware that submission or certification of false claims, or other Claims that violate law or the Contract, may lead to fines, imprisonment, and/or other serious legal consequences for myself and/or _____ *[Contractor company name]*.

While preparing this declaration and schedule I consulted with others (including attorneys, consultants, or others who work for _____ *[Contractor company name]*) when necessary to ensure that the statements were true and correct.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed _____, 20__, at _____, California.

_____ *[signature]*
_____ *[name of declarant]*

3.9.2 **DSA Oversight Process**

In connection with the DSA Construction Oversight Process which includes inspection cards and review of changes to the DSA-approved construction documents, the Contractor must (a) include specific tasks in its baseline schedule to take into account these procedures since they are critical path issues; and (b) include a reasonable amount of float in the baseline schedule to accommodate the additional time required by these DSA procedures.

3.9.3 **Failure to Meet Requirements**

Failure of the Contractor to provide proper schedules may, at the sole discretion of Owner,

constitute either grounds to withhold, in whole or in part, progress payments to the Contractor, or a breach of contract allowing Owner to terminate the Contract.

3.10 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the Site for the Owner one applicable copy of Titles 19 and 24 and record copy of the Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings,

Product Data, Samples, and similar required submittals. These documents shall be available to the Owner and shall be delivered to the Owner, or the Architect for delivery to the Owner, upon Completion of the Work.

3.11 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

3.11.1 Submittals Defined

3.11.1.1 ***Shop Drawings.*** The term “shop drawings” as used herein means drawings, diagrams, schedules, and other data, which are prepared by Contractor, Subcontractors, manufacturers, suppliers, or distributors illustrating some portion of the Work, and includes: illustrations; fabrication, erection, layout and setting drawings; manufacturer’s standard drawings; schedules; descriptive literature, instructions, catalogs, and brochures; performance and test data including charts; wiring and control diagrams; and all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and their position conform to the requirements of the Contract Documents. The Contractor shall obtain and submit with the shop drawings all seismic and other calculations and all product data from equipment manufacturers. “Product data” as used herein are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work. As used herein, the term “manufactured” applies to standard units usually mass-produced, and “fabricated” means items specifically assembled or made out of selected materials to meet individual design requirements. Shop drawings shall: establish the actual detail of all manufactured or fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical systems and equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

3.11.1.2 ***Samples.*** The term “samples” as used herein are physical examples furnished by Contractor to illustrate materials, equipment, or quality and includes natural materials, fabricated items, equipment, devices, appliances, or parts thereof as called for in the Specifications, and any other samples as may be required by the Owner to determine whether

the kind, quality, construction, finish, color, and other characteristics of the materials, etc., proposed by the Contractor conform to the required characteristics of the various parts of the Work. All Work shall be in accordance with the approved samples.

3.11.1.3 ***Contractor's Responsibility.*** Contractor shall obtain and shall submit to Architect all required shop drawings and samples in accordance with Contractor's "Schedule for Submission of Shop Drawings and Samples" provisions in Division 1 of the Specifications and in accordance with the Contractor's original and updated schedules, and with such promptness as to cause no delay in its own Work or in that of any other contractor, Owner or subcontractor but in no event later than ninety (90) days after the execution of the Agreement. Contractor may be assessed $100 a day for each day it is late in submitting a shop drawing or sample. No extensions of time will be granted to Contractor or any Subcontractor because of its failure to have shop drawings and samples submitted in accordance with the Schedule. Each Subcontractor shall submit all shop drawings, samples, and manufacturer's descriptive data for the review of the Owner, the Contractor, and the Architect through the Contractor. By submitting shop drawings, product data, and samples, the Contractor or submitting party (if other than Contractor) represents that it has determined and verified all materials, field measurements, field conditions, catalog numbers, related field construction criteria, and other relevant data in connection with each such submission, and that it has checked, verified, and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. At the time of submission, any deviation in the shop drawings, product data, or samples from the requirements of the Contract Documents shall be narratively described in a transmittal accompanying the submittal. However, submittals shall not be used as a means of requesting a substitution, the procedure for which is defined in paragraph 3.11.4, "Substitutions." Review by Owner and Architect shall not relieve the Contractor or any Subcontractor from its responsibility in preparing and submitting proper shop drawings in accordance with the Contract Documents. Contractor shall stamp, sign, and date each submittal indicating its representation that the submittal meets all of the requirements of the Contract Documents. Any submission, which in Owner's or Architect's opinion is incomplete, contains numerous errors, or has been checked only superficially by Contractor will be returned unreviewed for resubmission by the Contractor.

3.11.1.4 ***Extent of Review.*** In reviewing shop drawings, the Owner will not verify dimensions and field conditions. The Architect will review and approve shop drawings, product data, and samples for aesthetics and for conformance with the design concept of the Work and the information given in the Contract Documents. The Architect's review shall neither be construed as a complete check nor relieve the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called the Architect's attention to the deviations at the time of submission and the Architect has given specific written approval. The Architect's review shall not relieve the Contractor or Subcontractors from responsibility for errors of any sort in shop drawings or schedules, for proper fitting of the Work, or from the necessity of furnishing any Work required by the Contract Documents, which may not be indicated on shop drawings when reviewed.

Contractor and Subcontractors shall be solely responsible for determining any quantities, whether or not shown on the shop drawings.

3.11.2 **Drawing Submission Procedure**

3.11.2.1 ***Transmittal Letter and Other Requirements.*** All shop drawings must be properly identified with the name of the Contract and Contractor's name and dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the Contract and Contractor and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" on the submissions, all qualifications, departures, or deviations from the Contract Documents, if any. Shop drawings, for each section of the Work, shall be numbered consecutively, and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor. Only shop drawings required to be submitted by the Contract Documents shall be reviewed.

3.11.2.2 ***Copies Required.*** Each submittal shall include one (1) legible, reproducible sepia and five (5) legible prints of each drawing, including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the Specifications until final acceptance thereof is obtained. Subcontractor shall submit copies, in an amount as requested by the Contractor, of: manufacturers' descriptive data for materials, equipment, and fixtures, including catalog sheets showing dimensions, performance, characteristics, and capacities; wiring diagrams and controls; schedules; all seismic calculations and other calculations; and other pertinent information as required.

3.11.2.3 ***Corrections.*** The Contractor shall make any corrections required by Architect and shall resubmit as required by Architect the required number of corrected copies of shop drawings or new samples until approved. Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections required by the Architect on previous submissions. Professional services required for more than one (1) re-review of required submittals of shop drawings, product data, or samples are subject to charge to the Contractor pursuant to paragraph 4.4.

3.11.2.4 ***Approval Prior to Commencement of Work.*** No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been reviewed by Owner and approved by Architect unless specifically directed in writing by the Owner. All such portions of the Work shall be in accordance with approved shop drawings and samples.

3.11.3 **Sample Submissions Procedure**

3.11.3.1 ***Samples Required.*** In case a considerable range of color, graining, texture, or other characteristics may be anticipated in finished products, a sufficient number of samples of the specified materials shall be furnished by the Contractor to indicate the full range

of characteristics, which will be present in the finished products; and products delivered or erected without submittal and approval of full range samples shall be subject to rejection. Except for range samples, and unless otherwise called for in the various sections of the Specifications, samples shall be submitted in duplicate. All samples shall be marked, tagged, or otherwise properly identified with the name of the submitting party, the name of the Contract, the purpose for which the samples are submitted, and the date and shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number for identification of each item. Each tag or sticker shall have clear space for the review stamps of Contractor and Architect.

3.11.3.2 ***Labels and Instructions.*** Samples of materials, which are generally furnished in containers bearing the manufacturers' descriptive labels and printed application instructions, shall, if not submitted in standard containers, be supplied with such labels and application instructions.

3.11.3.3 ***Architect's Review.*** The Architect will review and, if appropriate, approve submissions and will return them to the Contractor with the Architect's stamp and signature applied thereto, indicating the appropriate action in compliance with the Architect's standard procedures.

3.11.3.4 ***Record Drawings and Annotated Specifications.*** The Contractor will prepare and maintain on a current basis an accurate and complete set of Record Drawings showing clearly all changes, revisions, and substitutions during construction, including, without limitation, field changes and the final location of all mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features, and Annotated Specifications showing clearly all changes, revisions, and substitutions during construction. A copy of such Record Drawings and Annotated Specifications will be delivered to Owner in accordance with the schedule prepared by Contractor. In the event of a specification that allows Contractor to elect one of several brands, makes, or types of material or equipment, the annotations shall show which of the allowable items the Contractor has furnished. The Contractor will update the Record Drawings and Annotated Specifications as often as necessary to keep them current but no less often than weekly. The Record Drawings and Annotated Specifications shall be kept at the Site and available for inspection by the Owner, Inspector of Record and the Architect. On Completion of the Contractor's Work and prior to Application for Final Progress Payment, the Contractor will provide one complete set of Record Drawings and Annotated Specifications to the Owner, certifying them to be a complete and accurate reflection of the actual construction conditions of the Work.

3.11.3.5 ***Equipment Manuals.*** Contractor shall obtain and furnish to the Owner three (3) complete sets of manuals containing the manufacturers' instructions for maintenance and operation of each item of equipment and apparatus furnished under the Contract Documents and any additional data specifically requested under the various sections of the Specifications for each division of the Work. The manuals shall be arranged in proper order, indexed, and placed in three-ring binders. At the Completion of its Work, the Contractor shall

certify, by endorsement thereon, that each of the manuals is complete, accurate, and covers all of its Work. Prior to submittal of Contractor's Application for Final Progress Payment, and as a further condition to its approval by the Architect, each Subcontractor shall deliver the manuals, arranged in proper order, indexed, endorsed, and placed in three-ring binders, to the Contractor, who shall assemble these manuals for all divisions of the Work, review them for completeness, and submit them to the Owner through the Architect.

3.11.3.6 ***Owner's Property.*** All shop drawings and samples submitted shall become the Owner's property.

3.11.4 **SUBSTITUTIONS**

3.11.4.1 ***One Product Specified.*** Unless the Specifications state that no substitution is permitted, whenever in the Contract Documents any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction is indicated or specified by name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of material, process, or article desired and shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article, which shall be substantially equal or better in every respect to that so indicated or specified and will completely accomplish the purpose of the Contract Documents.

3.11.4.2 ***Two or More Products Specified.*** When two or more acceptable products are specified for an item of the Work, the choice will be up to the Contractor. Contractor shall utilize the same product throughout the Project. If a timely substitution request as set forth in Section 3.11.4.3 is not provided and an "or equal" substitution is requested, the Owner may consider the substitution if the product specified is no longer commercially available. If the Owner allows the substitution to be proposed pursuant to such an untimely request, the Contractor will be responsible for the professional fees incurred by the Architect or Architect's consultants in reviewing the proposed substitution which fees may be withheld from progress payments and/or retention.

3.11.4.3 ***Substitution Request Form.*** Requests for substitutions of products, materials, or processes other than those specified must be made on the Substitution Request form available from the Owner. Any Requests submitted after the deadline specified in the Instructions to Bidders will not be considered, except as noted in paragraph 3.11.4.2. A Substitution Request must be accompanied by evidence as to whether or not the proposed substitution: is equal in quality and serviceability to the specified item; will entail no changes in detail and construction of related work; will be acceptable in consideration of the required design and artistic effect; will provide no cost disadvantage to Owner; and will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts. The burden of proof of these facts shall be upon the Contractor. The Contractor shall furnish with its request sufficient information to determine whether the proposed substitution is equivalent including but not limited to all drawings, specifications, samples, performance data, calculations,

and other information as may be required to assist the Architect and the Owner in determining whether the proposed substitution is acceptable. The final decision shall be the Owner's. The written approval of the Owner, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. Owner may condition its approval of the substitution upon delivery to Owner of an extended warranty or other assurances of adequate performance of the substitution. All risks of delay due to the Division of the State Architect's approval, or the approval of any other governmental agency having jurisdiction, of a requested substitution shall be on the requesting party.

3.11.4.4 ***List of Manufacturers and Products Required.*** The Subcontractor shall prepare and submit to the Contractor within thirty (30) days of execution of the Subcontract comprehensive lists, in quadruplicate, of the manufacturers and products proposed for the Project, including information on materials, equipment, and fixtures required by the Contract Documents, as may be required for Contractor's or Architect's preliminary approval. Approval of such lists of products shall not be construed as a substitute for the shop drawings, manufacturer's descriptive data, and samples, which are required by the Contract Documents, but rather as a base from which more detailed submittals shall be developed for the final review of the Contractor and the Architect.

3.11.5 Deferred Approvals

Deferred approvals shall be submitted and processed pursuant to the requirements of Division 1 of the Specifications. All risks of delay due to the Division of the State Architect's, or any other governmental agency having jurisdiction, approval of a deferred approval shall be on the requesting party.

3.12 CUTTING AND PATCHING

3.12.1 Scope

The Contractor shall be responsible for cutting, fitting, or patching required to Complete the Work or to make its parts fit together properly.

3.12.2 Consent

The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or a separate contractor by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work. All cutting shall be done promptly, and all repairs shall be made as necessary.

3.12.3 Structural Members

New or existing structural members and elements, including reinforcing bars and seismic bracing, shall not be cut, bored, or drilled except by written authority of the Architect. Work done contrary to such authority is at the Contractor's risk, subject to replacement at its own expense and without reimbursement under the Contract. Agency approvals shall be obtained by the Architect, not by the Contractor.

3.12.4 Subsequent Removal

Permission to patch any areas or items of the Work shall not constitute a waiver of the Owner's or the Architect's right to require complete removal and replacement of the areas of items of the Work if, in the opinion of the Architect or the Owner, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents. Any costs caused by defective or ill-timed cutting or patching shall be borne by the person or entity responsible.

3.13 CLEANING UP

3.13.1 Contractor's Responsibility

The Contractor shall keep the Site and surrounding area free from accumulation of waste material or rubbish caused by operations under the Contract. The Site shall be maintained in a neat and orderly condition. All crates, cartons, paper, and other flammable waste materials shall be removed from Work areas and properly disposed of at the end of each day. The Contractor shall continuously remove from and about the Site the waste materials, rubbish, tools, construction equipment, machinery, and materials no longer required for the Work.

3.13.2 Failure to Cleanup

If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so, without prior notice to the Contractor and the cost thereof shall be invoiced to the Contractor and withheld from progress payments and/or retention. Each Subcontractor shall have the responsibility for the cleanup of its own Work. If the Subcontractor fails to clean up, the Contractor must do so.

3.13.3 Construction Buildings

When directed by the Owner or the Architect, Contractor and Subcontractor shall dismantle temporary structures, if any, and remove from the Site all construction and installation equipment, fences, scaffolding, surplus materials, rubbish, and supplies belonging to Contractor or Subcontractor. If the Contractor does not remove the tools, equipment, machinery, and materials within fifteen (15) days after Completion of its Work, then they shall be deemed abandoned, and the Owner can dispose of them for its own benefit in whatever way it deems

appropriate. Contractor shall pay for any costs to dispose of the items.

3.14 ACCESS TO WORK

The Contractor shall provide the Owner, the Architect, and the Inspector of Record, access to the Work in preparation and progress wherever located.

3.15 ROYALTIES AND PATENTS

3.15.1 Payment and Indemnity

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims of infringement of patent rights and shall hold the Owner and the Architect harmless and indemnify them, to the extent not caused by the Owner's active negligence, sole negligence or willful misconduct, from loss on account thereof but shall not be responsible for such defense or loss when a particular design, process, or product of a particular manufacturer is required by the Contract Documents. However, if the Contractor has reason to believe the required design, process, or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Owner and Architect.

3.15.2 Review

The review by the Owner or Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for the use by the Contractor in violation of any patent or other rights of any person or entity.

3.16 INDEMNIFICATION

3.16.1 Scope: Contractor

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, any construction manager, Architect, Architect's consultants, the Inspector of Record, the State of California, and their respective agents, employees, officers, volunteers, Boards of Trustees, members of the Boards of Trustees, and directors ("Indemnitees"), from and against claims, actions, damages, liabilities, losses (including but not limited to injury or death of persons, property damage, and compensation owed to other parties), and expenses (including but not limited to attorneys' fees and costs including fees of consultants) alleged by third parties against Indemnitees arising out of or resulting from the following: Contractor's, its Subcontractors', or its suppliers' performance of the Work, including but not limited to the Contractor's or its Subcontractors' use of the Site; the Contractor's or its Subcontractors' construction of the Work, or failure to construct the Work, or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such

machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Contractor or its Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Contractor, its Subcontractors, its suppliers, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. The obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Contractor shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance policies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Contractor.

3.16.2 **SCOPE: SUBCONTRACTORS**

3.16.2.1 ***Indemnity.*** The Subcontractors shall defend, indemnify, and hold harmless the Indemnitees from and against claims, actions, damages, liabilities, and losses (including but not limited to injury or death of persons, property damage, and compensation owed to other parties), and expenses (including but not limited to attorneys' fees and costs including fees of consultants) alleged by third parties against Indemnitees arising out of or resulting from the following: Subcontractors' performance of the Work, including but not limited to the Subcontractors' use of the Site; the Subcontractors' construction of the Work or failure to construct the Work or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment, including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. This obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Subcontractors shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance policies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Subcontractors.

3.16.2.2 ***Joint and Several Liability.*** In the event more than one Subcontractor is connected with an accident or occurrence covered by this indemnification, then all such Subcontractors shall be jointly and severally responsible to each of the Indemnitees for indemnification, and the ultimate responsibility among such indemnifying Subcontractors for the loss and expense of any such indemnification shall be resolved without jeopardy to any Indemnitee. The provisions of the indemnity provided for herein shall not be construed to indemnify any Indemnitee for its own negligence if not permitted by law or to eliminate or reduce any other indemnification or right which any Indemnitee has by law or equity.

3.16.3 **No Limitation**

The Contractor's and the Subcontractor's obligation to indemnify and defend the Indemnitees hereunder shall include, without limitation, any and all claims, damages, and costs: for injury to persons and property (including loss of use), and sickness, disease or death of any person; for breach of any warranty, express or implied; for failure of the Contractor or the Subcontractor to comply with any applicable governmental law, rule, regulation, or other requirement; and for products installed in or used in connection with the Work.

3.17 OWNER AS INTENDED BENEFICIARY

The Owner is an intended beneficiary of any architectural or engineering work secured by, or performed by, the Contractor to fulfill its obligations under the Contract. Contractor shall state in its contracts with architectural or engineering consultants that their work is for the intended benefit of the Owner.

3.18 **NOTICE OF EXCUSE FOR NONPERFORMANCE**

If Contractor believes that acts or omissions of Owner (including but not limited to Owner caused delay) have prevented Contractor from performing the Work as required by the Contract Documents and Contractor intends to rely on Owner's acts or omissions and Civil Code section 1511(1) as reasons to excuse Contractor's nonperformance or to support, among other things, Contractor's requests for time extensions under Section 4.5, below, Contractor shall provide written notice of the excuse within five (5) days of the Owner's acts or omissions. If Contractor fails to timely submit the written notice, Contractor shall have waived any right to later rely on the acts or omissions as a defense to Contractor's nonperformance or as the basis for a time extension, regardless of the merits of the defense or time extension. Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Contractor acknowledges that these written notices are of critical importance to the Owner's management of the Work and Project and the mitigation of costs and delays to the Work and Project.

3.19 RECOVERY OF COSTS, DAMAGES, OR TIME EXTENSIONS FROM OWNER

Notwithstanding any other provisions of the Contract Documents, Contractor expressly waives its right to recover any special, consequential, or indirect damages from Owner in relation to this Contract or the Project. Contractor may only recover general (also known as direct) damages from Owner to the extent allowed by the Contract Documents.

A Notice of Potential Change, Change Order Request and, if necessary, a Claim (see Sections 4.5, 7.2, and 7.6, below) are the exclusive means for Contractor to preserve its rights to recover any costs, damages, or time extensions related to the Contract or the Project from Owner, including but not limited to alleged breaches of contract based on extra work, delay, wrongful withholding, or wrongful termination. Contractor's failure to comply with the Contract Documents' procedures for a COR, CO, and Claim (including but not limited to Sections 4.5, 7.2, 7.6, and 7.7, below) may completely waive Contractor's rights to recovery any such costs or damages.

3.20 **USE OF FEDERAL FUNDS**

If federal funds are being used either in whole or in part for this Project (see the Instructions to Bidders), then the Project is subject to, and Contractor must comply with, all applicable federal laws including but not limited to the federal regulations set forth in CFR Title 2, Part 200. Accordingly, Contractor agrees to comply with all such federal requirements, including but not limited to the following:

A. EQUAL EMPLOYMENT OPPORTUNITY. Contractor agrees to comply with and be bound by Title 14, CFR, Section 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," the terms of which are incorporated by reference as though set forth in full herein.

B. DAVIS-BACON ACT. If the Contract Price exceeds $2,000, Contractor agrees to comply with and be bound by, and assist Owner in ensuring compliance with, the Davis-Bacon Act, as applicable and comply with the requirements and wage determinations. (40 U.S.C. §§ 3141-3144; 3146-3148 as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction").) Contractor is required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. Additionally, Contractor is required to pay wages not less than once a week. Furthermore, pursuant to the Copeland "Anti-Kickback" Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"), Contractor is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled.

Any contract in excess of $2,000 is subject to the following:

(1) Minimum Wages

a. ***Wage rates and fringe benefits.*** All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of this section, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act (40 U.S.C. 3141(2)(B)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(v) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are

deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph (a)(4) of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided,* That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (a)(1)(iii) of this section) and the Davis-Bacon poster (WH–1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. ***Frequently reoccurring classifications.***
   i. In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in 29 CFR part 1, a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph (a)(1)(iii) of this section, provided that:
      1. The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;
      2. The classification is used in the area by the construction industry; and
      3. The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.
   ii. The Administrator will establish wage rates for such classifications in accordance with paragraph (a)(1)(iii)(A)(*3*) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. **Conformance.**
   i. The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:
      1. The work to be performed by the classification requested is not performed by a classification in the wage determination; and
      2. The classification is used in the area by the construction industry; and
      3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

ii. The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

iii. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to *DBAconformance@dol.gov*. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.

iv. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to *DBAconformance@dol.gov*, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.

v. The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division under paragraphs (a)(1)(iii)(C) and (D) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph (a)(1)(iii)(C) or (D) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. **Fringe benefits not expressed as an hourly rate.** Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. ***Unfunded plans.*** If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided,* That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. ***Interest.*** In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

(2) Withholding

a. ***Withholding requirements.*** Owner may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in paragraph (a) of this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work (or otherwise working in construction or development of the project under a development statute) all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph (a)(3)(iv) of this section, Owner may on its own initiative and after written notice to the contractor take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. ***Priority to withheld funds.*** The Department has priority to funds withheld or to be withheld in accordance with paragraph (a)(2)(i) or (b)(3)(i) of this section, or both, over claims to those funds by:

i. A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
ii. A contracting agency for its reprocurement costs;
iii. A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
iv. A contractor's assignee(s);
v. A contractor's successor(s); or
vi. A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901–3907.

(3) Records and certified payrolls

a. Basic record requirements

i. *Length of record retention.* All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

ii. *Information required.* Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

iii. *Additional records relating to fringe benefits.* Whenever the Secretary of Labor has found under paragraph (a)(1)(v) of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

iv. *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

v. *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. Certified payroll requirements

i. *Frequency and method of submission.* The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the appropriate Federal agency if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the certified payrolls to Owner, or other entity, as the case may be, that maintains such records, for transmission to the appropriate agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

ii. *Information required.* The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph (a)(3)(i)(B) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (*e.g.,* the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH–347 or in any other format desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division website at *https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347/.pdf* or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to Owner, or other entity, as the case may be, that maintains such records).

iii. *Statement of Compliance.* Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

1. That the certified payroll for the payroll period contains the information required to be provided under paragraph (a)(3)(ii) of this section, the appropriate information and basic records are being maintained under paragraph (a)(3)(i) of this section, and such information and records are correct and complete;
2. That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3; and
3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

iv. *Use of Optional Form WH–347.* The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(C) of this section.

v. *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

vi. *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 3729.

vii. *Length of certified payroll retention. The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.*

viii. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. Required disclosures and access

i. *Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs (a)(3)(i) through (iii) of this section, and any other documents that the Owner or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by Owner's authorized representatives or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

ii. *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, Owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under 29 CFR part 6 any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

iii. *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address of each covered worker, and must

provide them upon request to the appropriate Federal agency if the agency is a party to the contract, or to the Wage and Hour Division of the Department of Labor. If the Federal agency is not such a party to the contract, the contractor, subcontractor, or both, must, upon request, provide the full Social Security number and last known address, telephone number, and email address of each covered worker to Owner, or other entity, as the case may be, that maintains such records, for transmission to the appropriate agency, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

(4) Apprentices and equal employment opportunity

a. Apprentices

i. *Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

ii. *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

iii. *Apprenticeship ratio.* The allowable ratio of apprentices to journeyworkers on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph (a)(4)(i)(D) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph (a)(4)(i)(A) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be

paid not less than the applicable wage rate on the wage determination for the work actually performed.

iv. *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. ***Equal employment opportunity.*** The use of apprentices and journeyworkers under this part must be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) *Compliance with Copeland Act requirements.* The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) *Subcontracts.* The contractor or subcontractor must insert in any subcontracts the clauses contained in paragraphs (a)(1) through (11) of this section, along with the applicable wage determination(s) and such other clauses or contract modifications as the appropriate agency and/or Owner may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate.

(7) *Contract termination: debarment.* A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) *Compliance with Davis-Bacon and Related Act requirements.* All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) *Disputes concerning labor standards.* Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of 40 U.S.C. 3144(b) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of 40 U.S.C. 3144(b) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, 18 U.S.C. 1001.

(11) ***Anti-retaliation.*** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or 29 CFR part 1 or 3;
b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or 29 CFR part 1 or 3;
c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or 29 CFR part 1 or 3; or
d. Informing any other person about their rights under the DBA, Related Acts, this part, or 29 CFR part 1 or 3.

(12) *Copies of Wage Determinations.* Copies of applicable wage determinations are included in the bid package for this contract, and are incorporated by reference as Contract Documents.

C. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT. If the Contract Price exceeds $100,000 that involve the employment of mechanics or laborers, Contractor agrees to comply with and be bound by, and assist Owner in ensuring compliance with, the Contract Work Hours and Safety Standards Act, as applicable. (40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5).) Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

In addition to the above, any contract in excess of $100,000 is subject to the following:

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from

the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $31 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1).

(3) Withholding for unpaid wages and liquidated damages

a. ***Withholding process.*** Owner may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this paragraph (b) on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. ***Priority to withheld funds.*** The Department has priority to funds withheld or to be withheld in accordance with paragraph (a)(2)(i) or (b)(3)(i) of this section, or both, over claims to those funds by:

   i. A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
   ii. A contracting agency for its reprocurement costs;
   iii. A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
   iv. A contractor's assignee(s);
   v. A contractor's successor(s); or
   vi. A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901–3907.

c. ***Subcontracts.*** The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs (b)(1) through (5) of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (5). In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

d. ***Anti-retaliation.*** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:
    i. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
    ii. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
    iii. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
    iv. Informing any other person about their rights under CWHSSA or this part.

D. RIGHTS TO INVENTIONS MADE UNDER A CONTRACT AGREEMENT. For all contracts that meet the definition of "funding agreement" under 37 CFR § 401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," Contractor agrees to comply with and be bound by, and assist Owner in ensuring compliance with, 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," the provisions of which are incorporated herein by this reference, and any implementing regulations issued by the awarding agency, as applicable.

E. CLEAN AIR AND FEDERAL WATER POLLUTION ACT CONTROL. If the Contract Price exceeds $150,000, Contractor agrees to comply with and be bound by, and assist Owner in ensuring compliance with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Any violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

F. DEBARMENT AND SUSPENSION. Contractor represents and warrants that it is not listed on the government-wide exclusions in the System for Award Management (SAM), and Contractor agrees to comply with and be bound by, and assist Owner in ensuring compliance with, the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

G. BYRD ANTI-LOBBYING AMENDMENT. If the Contract Price exceeds $100,000, Contractor agrees to comply with and be bound by, and assist Owner in ensuring compliance

with, the Byrd Anti-Lobbying Amendment (31 U.S.C. § 1352). Contractor shall file the declaration and certification required by 31 U.S.C. § 1352(b).

H. PROCUREMENT OF RECOVERED MATERIALS. Contractor agrees to comply with, and be bound by, and assist Owner in ensuring compliance with, 2 CFR Section 200.323, as applicable.

I. PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT. Contractor agrees to comply with, and be bound by, and assist Owner in ensuring compliance with, 2 CFR Section 200.216, as applicable.

J. DOMESTIC PREFERENCES FOR PROCUREMENT. Contractor agrees to comply with, and be bound by, and assist Owner in ensuring compliance with, 2 CFR Section 200.322, as applicable. 2 CFR Section 200.322 requires Contractor to provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products), to the greatest extent practicable.

K. CONTRACTING WITH SMALL AND MINORITY BUSINESSES, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS. Contractor agrees to comply with, and be bound by, and assist Owner in ensuring compliance with, 2 CFR Section 200.321, as applicable. 2 CFR Section 200.321 requires Contractor to take the affirmative steps listed in 2 CFR Section 200.321 paragraphs (b)(1) through (5) to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible.

L. SAFETY AND HEALTH STANDARDS. As required by 34 CFR 75.609, Contractor agrees to comply with and be bound by, and assist Owner in ensuring compliance with, the standards under the Federal Occupational Safety and Health Act of 1970 (29 U.S.C.A., Section 651 et seq.) and State and local codes to the extent that they are more stringent.

M. ENERGY CONSERVATION. As required by 34 CFR 75.616, Contractor agrees to construct facilities to maximize the efficient use of energy and to comply with and be bound by, and assist OWNER in ensuring compliance with, the following standards of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) set forth in 34 CFR 75.616. Contractor shall also comply with and be bound by, and assist Owner in ensuring compliance with, the mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plans issued in compliance with the Energy Policy and Conservation Act (Pub. L 94-163, 89 Stat. 871).

N. If any provision is required by federal law, or by the federal grant program funding such project, to be included in the Contract Documents, such provisions shall be deemed by the parties to have been included.

ARTICLE 4

ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.1 Definition

The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative, and shall also refer to all consultants under the Architect's direction and control.

4.1.2 Modification

To the extent the Contract Documents indicate that Owner has assigned duties or responsibilities to the Architect, Owner reserves the right at all times to reassign such duties or responsibilities to different Owner representatives.

4.1.3 Termination

In the case of the termination of the Architect, the Owner may appoint an architect or another construction professional or may perform such functions with its own licensed professional personnel. The status of the replacement Architect under the Contract Documents shall be that of the former architect.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 Status

The Architect will provide administration of the Contract and may be one of several Owner's representatives during construction, through release of all retention, and during the one (1) year period following the commencement of any warranties. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent set forth in the Owner/Architect agreement. The Architect will have all responsibilities and power established by law, including California Code of Regulations, Title 24, to the extent set forth in the Owner/Architect agreement.

4.2.2 Site Visits

The Architect will visit the Site at intervals necessary in the judgment of the Architect or as otherwise agreed by the Owner and the Architect in writing to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being

performed in a manner indicating that the Work, when Completed, will be in accordance with the Contract Documents.

4.2.3 Limitations of Construction Responsibility

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

4.2.4 Communications Facilitating Contract Administration

The Owner and the Contractor shall communicate through the Architect, unless there is a construction manager for the Project or the Owner directs otherwise. Communications between Owner and Subcontractors or material or equipment suppliers shall be through the Contractor.

4.2.5 Payment Applications

The Contractor shall submit payment applications to the Architect, unless there is a construction manager for the Project or the Owner directs otherwise.

4.2.6 Rejection of Work

The Architect, Inspector of Record, any construction manager and others may recommend to the Owner that the Owner reject Work which does not conform to the Contract Documents or that the Owner require additional inspection or testing of the Work in accordance with paragraph 13.5.5, whether or not the Work is fabricated, installed, or completed. However, no recommendation shall create a duty or responsibility to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.2.7 Change Orders

The Architect may prepare change orders and construction change directives and may authorize minor changes in the Work.

4.2.8 Warranties Upon Completion

The Architect in conjunction with the Inspector of Record, or as otherwise directed by Owner, will conduct field reviews of the Work to determine the date of Completion, shall receive and forward to the Owner for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor. The handling by the Architect of such warranties, maintenance manuals, or similar documents shall not diminish or transfer to the Architect any responsibilities or liabilities required by the Contract Documents of

the Contractor or other entities, parties, or persons performing or supplying the Work.

Except as may be otherwise directed by Owner, the Architect will conduct a field review of the Contractor's work pursuant to Section 9.7.1, below, for development of a punch list and one (1) follow-up field review if required. The cost incurred by the Owner for further field reviews or the preparation of further punch lists by the Architect shall be invoiced to the Contractor and withheld from payment and/or retention.

4.2.9 INTERPRETATION

The Architect, Inspector of Record, any construction manager, the Owner or any independent consultant of Owner, as Owner deems appropriate, will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of the Contractor. The Owner's response to such requests will be made with reasonable promptness, while allowing sufficient time to permit adequate review and evaluation of the request.

4.2.10 ADDITIONAL INSTRUCTIONS

4.2.10.1 ***Architect's Interpretations and Decisions.*** Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations of and decisions regarding the Contract Documents, the Architect will endeavor to secure faithful performance under the Contract Documents by both the Owner and the Contractor and will not show partiality to either. The Work shall be executed in conformity with, and the Contractor shall do no work without, approved drawings, Architect's clarifying instructions, and/or submittals.

4.2.10.2 ***Typical Parts and Sections.*** Whenever typical parts or sections of the Work are completely detailed on the Drawings, and other parts or sections which are essentially of the same construction are shown in outline only, the complete details shall apply to the Work which is shown in outline.

4.2.10.3 ***Dimensions.*** Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on Drawings, Architect shall supply them on request. The Owner's decisions on matters relating to aesthetic effect will be final if consistent with the Contract Documents.

4.3 INSPECTOR OF RECORD

4.3.1 GENERAL

One or more Project inspectors ("Inspector of Record") employed by the Owner and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. The Inspector of Record's duties

will be as specifically defined in Title 24.

4.3.2 Inspector of Record's Duties

All Work shall be under the observation of or with the knowledge of the Inspector of Record. The Inspector of Record shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector of Record such information as may be necessary to keep the Inspector of Record fully informed regarding progress and manner of work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor's responsibility for providing efficient and capable superintendence. The Inspector of Record is not authorized to make changes in the drawings or specifications nor shall the Inspector of Record's approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

4.3.3 Inspector of Record's Authority to Reject or Stop Work

The Inspector of Record shall have the authority to reject work that does not comply with the provisions of the Contract Documents. In addition, the Inspector of Record may stop any work which poses a probable risk of harm to persons or property. The Contractor shall instruct its employees, Subcontractors, material and equipment suppliers, etc., accordingly. The absence of any Stop Work order or rejection of any portion of the Work shall not relieve the Contractor from any of its obligations pursuant to the Contract Documents.

4.3.4 Inspector of Record's Facilities

Within seven (7) days after notice to proceed, the Contractor shall provide the Inspector of Record with temporary facilities.

4.4 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE OWNER FOR PROFESSIONAL SERVICES

If at any time prior to the Completion of the requirements under the Contract Documents, through no fault of its own, the Owner is required to provide or secure additional professional services for any reason by any act or omission of the Contractor, the Contractor shall be invoiced by the Owner for any actual costs incurred for any such additional services, which costs may, among other remedies, be withheld from the progress payments and/or retention. Such invoicing shall be independent from any other Owner remedies, including but not limited to liquidated damages; ***except that*** to the extent that such additional services constitute Owner's delay damages under Public Contract Code section 7203, Owner may not recover them or invoice Contractor for them. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. Additional services shall include, but shall not be limited to, the following:

A. Services made necessary by the default of the Contractor.

B. Services made necessary due to the defects or deficiencies in the Work of the Contractor.

C. Services required by failure of the Contractor to perform according to any provision of the Contract Documents.

D. Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors proposed by the Contractor, and making subsequent revisions to drawings, specifications, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available).

E. Services for evaluating and processing Claims submitted by the Contractor in connection with the Work outside the established Change Order process.

F. Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time for Completion.

G. Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.

H. Services in conjunction with more than one (1) re-review of required submittals of shop drawings, product data, and samples.

4.5 NOTICES OF POTENTIAL CHANGE, CHANGE ORDER REQUESTS, AND CLAIMS

If the Contractor identifies the potential for extra work, delay in the critical path schedule, or the need for additional money or time, or if the Contractor requests additional money or time on any grounds (including but not limited to an alleged breach of an implied warranty of the correctness of the plans and specifications [*Souza & McCue Construction Co. v. Superior Court* (1962) 57 Cal.2d 508]), or if the Contractor believes that Owner has failed to pay amounts due or otherwise breached the Contract, or otherwise believes that it is entitled to a modification of the Contract terms and conditions, then Contractor shall follow the procedures in this Section 4.5 and Article 7, otherwise Contractor shall have waived its rights to pursue those issues and any later attempts to recover money or obtain a modification shall be barred. Contractor specifically acknowledges the Owner's and public's interest in, and need to know of, potential changes and disputes as early as possible so Owner can investigate, mitigate and resolve adverse cost and time impacts, if any. It is Contractor's obligation to know and comply with the requirements of the Contract Documents, including but not limited to Section 4.5 and Articles 7 and 8, and Owner has no obligation to notify Contractor of any failure to comply with those requirements.

4.5.1 Notice of Potential Change

Contractor shall submit a written Notice of Potential Change to the Owner for extra work (including acceleration or disruption), critical path delay, or additional money or time, including any money or time based on a request submitted to Contractor by one of Contractor's Subcontractors or suppliers (see Section 4.5.5.4, below). Contractor shall submit such Notices of Potential Change to Owner within five (5) days of the earlier of (a) Contractor becoming aware of the issue creating a potential change, or (b) the date by which Contractor should have become aware of the issue creating a potential change; unless the issues are, or may soon be, adversely affecting the costs or critical path of the Work, in which case the Contractor must submit the written notice without delay so the Owner may take immediate action to mitigate cost and schedule impacts of the change, if any. The written notice shall explain the nature of the potential change so the Owner may take action to mitigate costs and schedule impacts, if necessary.

When submitting a written Notice of Potential Change based on extra work (including acceleration or disruption), Contractor shall not perform the extra work until directed in writing to do so by Owner. When submitting a written Notice of Potential Change for an issue of critical path delay, Contractor shall proactively mitigate the effects of the alleged delay as much as reasonably possible so as to minimize any impact to the schedule, until otherwise directed by Owner. If Contractor intends to rely on Owner's acts or omissions in support of a request for a time extension, then Contractor must also provide the notice set forth in section 3.18, above.

If Contractor wants to accelerate its work to minimize or avoid delay, Contractor must submit a Notice of Potential Change for the delay, any delay damages, the need for any time extensions, and the cost impact of the desired acceleration. If Contractor's Work is disrupted and thus

creates extra work or delay, Contractor must submit a Notice of Potential Change for the delay, any delay damages, the need for any time extensions, and the cost impact of the disruption.

Failure to timely submit a written Notice of Potential Change shall constitute a complete waiver by Contractor of any right to later submit a change order request or pursue a Claim on that issue, or to later pursue any additional money or time extensions in any manner related to that issue, regardless of the merits. Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Contractor acknowledges that these written notices are of critical importance to the Owner's Work and Project management and the mitigation of Work and Project costs and delays.

4.5.2 CHANGE ORDERS REQUESTS

If, after submitting a written Notice of Potential Change pursuant to Section 4.5.1, Contractor continues to believe that it is entitled to additional money or time (including but not limited to grant of a time extension) based on an issue (including but not limited to money or time based on a request by a Subcontractor or supplier; see Section 4.5.5.4, below), then Contractor shall submit a Change Order Request ("COR"; see Section 7.6.1) to Owner within twenty (20) days of the earlier of (i) Contractor becoming aware of the issue creating a potential change, or (ii) the date by which Contractor should have become aware of the issue creating a potential change. A rejection at any time, or a lack of a rejection, by Owner of a Notice of Potential Change does not affect the timeline for submitting a COR.

Failure to timely submit a COR related to an issue, or failure to include any information in a timely COR for that issue as specifically required by the Contract, shall constitute a complete waiver by Contractor of any right to later submit a COR or Claim on that issue, or to later pursue any additional money or time in any manner related to that issue, regardless of the merits. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

The COR shall state the grounds for the additional money or time requested and the amount of money or time requested, and Contractor shall include all information and documentation supporting the COR, including but not limited to calculations and analysis that demonstrate that the requested money or time is allowed by the applicable contract provisions and law. For any money or time other than the money and time specifically requested in the COR, Contractor will have completely waived its rights to recover such additional money or time (Contractor will not have satisfied a condition precedent or exhausted administrative remedies). If the COR requests money, then the COR must explain how the requested amounts were calculated. If the COR requests time, then the COR must identify the number of days of time being requested, establish that the days of delay are excusable (see Section 8.4.1), and include some critical path schedule analysis to support the number of days requested. Contractor may not reserve its rights, whether in a COR or other document, to submit a COR at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a COR shall be grounds for rejection of the COR.

In the event that costs or delay are continuing to accrue at the time that a COR is required to be submitted, Contractor must still timely submit the COR with all available information and documentation supporting the COR as described above, and Contractor shall identify the costs or delay that are continuing. For continuing costs, the COR must include an estimate of when the extra work is expected to conclude and the total costs that will be incurred by the time that the extra work is expected to conclude. For continuing delay, the COR must include a schedule and delay analysis of when Contractor estimates that the delay will cease, what the final time extension request is estimated to be, and an estimate of the total of delay damages, if any, that will be requested. When the continuing cost or delay ends, within ten (10) days Contractor shall submit an updated COR that states the final dollar amount and/or time extension requested and that includes all required information and documentation. Failure to submit such final COR shall act as a waiver as described above.

Contractor shall certify each COR that it submits, including the initial COR and final COR for a continuing cost or delay, using the form set forth in Section 4.5.5.1, except that every reference to "Claim" shall be changed to "COR." If a COR is submitted without certification, a certification can still be submitted within the timelines set forth in the first paragraph of Section 4.5.2. If the COR is not timely certified, Contractor will have completely waived its rights to any money or time for that issue. Contractor will not have satisfied a condition precedent or exhausted administrative remedies. A certification of an initial COR for a continuing cost or delay shall include a statement that "Any estimates in the attached initial COR for a continuing cost or delay are based on true and correct facts and reasonable assumptions, as explained in the initial COR."

The Owner may accept the entire COR, accept part of the COR and reject the remainder, reject the entire COR, or request additional information. If the Owner does not respond within thirty (30) days of submission of the COR by accepting the entire COR, accepting part of the COR and rejecting the remainder, or requesting additional information, the entire COR shall be deemed rejected as of the thirtieth (30th) day. In the case of continuing costs or delay, the 30-day deadline in the previous sentence shall not apply to the initial COR; it will only apply to the final COR (see above). If the Owner requests additional information within thirty (30) days of submission, then the Contractor shall submit the information within fifteen (15) days of the date of the request and the Owner shall have fifteen (15) days after the receipt of the additional information to accept or reject (in whole or in part) the COR. If the Contractor fails to submit the information within fifteen (15) days, then the COR shall be deemed rejected. If the Owner fails to respond within fifteen (15) days after the submission of additional information, the entire COR shall be deemed rejected as of the fifteenth (15th) day.

4.5.3 Definition of Claim

A "Claim" is a separate demand by the Contractor sent by registered or certified mail, return receipt requested, for (a) a time extension, including, without limitation, a request for relief from

damages or penalties for delay assessed by Owner under the Contract Documents; (b) payment by Owner of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract Documents, and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to (including but not limited to a claim for damages based on misleading or incomplete plans or specifications); or (c) an amount the payment of which is disputed by the Owner. A Claim includes any claim within the scope of Public Contract Code sections 9204 or 20104 et seq., and any alleged violation of a prompt payment statute. A Claim includes any dispute Contractor may have with the Owner, including one which does not require a Notice of Potential Change or COR under Sections 4.5.1 and 4.5.2, and including any alleged breach of contract or violation of law by the Owner (such as wrongful withholding of a payment by the Owner or wrongful termination by the Owner). A Claim under this Article 4.5 shall also constitute a claim for purposes of the California False Claims Act. However, resubmittal of a COR which was previously rejected under Section 4.5.2 (whether rejected expressly [in whole or in part] or deemed rejected by Owner inaction), including but not limited to a request for reconsideration, does not constitute a Claim. In the event of a conflict between a Claims provision in Division 1 of the Specifications and Section 4.5, Section 4.5 shall take precedence.

The Notice of Potential Change and COR procedures above are less formal procedures which precede the more formal Claim. A Notice of Potential Change does not constitute a Claim. A COR does not constitute a Claim; **except that** if insufficient time remains before the Claim deadline (see Article 4.5.4) for Contractor to submit a COR and for Owner to process and reject the COR under Article 4.5.2, then either (1) Contractor may submit a COR which Owner shall treat as a Claim, but only if the COR complies with all requirements in this Article 4.5 and Article 7 for COR's and Claims, or (2) a COR is not required so long as a Claim complying with this Article 4.5 is timely submitted.

A Claim does not include vouchers, invoices, progress payment applications, or other routine or authorized forms of requests for progress payments on the Contract; however, those documents remain "claims" for purposes of the California False Claims Act. A Claim does not include a Government Code Claim. ("Government Code Claim" means a claim under Government Code sections 900 et seq. and 910 et seq.)

4.5.4 Time for Submitting Claim; Waiver

Contractor shall submit a Claim to the Owner's construction manager (or in the absence of a construction manager, to Architect) and Owner within the earlier of (a) fifteen (15) days after Owner's rejection of a COR in whole or in part, or (b) fifteen (15) days after a COR being deemed rejected, pursuant to Section 4.5.2 above. If the Claim is not based on an issue for which a COR would be required (such as wrongful withholding by the Owner), then Contractor shall submit the Claim within fifteen (15) days after the date on which Contractor knew, or should have known, about the issue on which the Claim is based. If a Claim has not been submitted as of the date that the Contractor Completes the Work and submittal of the Claim was not yet required under the Contract Documents, then the Claim shall be submitted within seven

(7) days of Completion of the Work; and such Claim shall not be barred due to lack of a Notice of Potential Change or COR if the deadline for the Notice of Potential Change or COR was after Completion of the Work.

In addition, within seven (7) days of Completion of the Work, Contractor shall submit to Owner, in writing, a list and summary of all Claims for money or time extensions under or arising out of this Contract which were timely filed, which were fully compliant with the Contract's requirements for Claims, and which the Contractor wishes to pursue in whole or in part. This Claim summary requirement shall not extend the time for submitting a Claim.

Failure to timely submit a Claim or Claim summary, failure to specifically identify a Claim in the Claim summary, or failure to include any information in a timely Claim as specifically required by the Contract, including but not limited to this Article 4, will act as a complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim for the money or time (see Section 4.5.6), and (c) initiate any action, proceeding or litigation for the money or time, regardless of the merits; Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Owner does not have an obligation to reject the Claim for a failure to comply with any of the Claim requirements in the Contract, including the lack of certification, and any failure by Owner to reject, or any delay in rejecting, a Claim on that basis does not waive the Owner's right to reject the Claim on that basis at a later time. In no event may the Contractor reserve its rights to assert a Claim for a time extension or additional money beyond the timelines set forth in this provision unless the Owner agrees in writing to allow the reservation.

4.5.5 CONTENT OF CLAIM

4.5.5.1 ***Claim Format; Waiver***

Every Claim shall be in writing. All money or time extensions sought must be stated and itemized in the Claim at the time submitted. The responsibility to substantiate Claims shall rest with the Contractor, and the Contractor shall furnish reasonable documentation to support each Claim, including as applicable, that documentation set forth in sections 4.5.5.2 through 4.5.5.4. In addition, the Contractor shall include a certification with each and every Claim at the time of submission, as follows:

> I, _____ *[name of declarant]*, declare the following:
>
> _____ *[Contractor company name]* has contracted with ____ *[public entity name]* for the _____ Contract ("Contract").
> _____ *[Contractor company name]* authorized me to prepare the attached Claim for money and/or time extension for _____ *[public entity name]* regarding this Contract (such Claim being dated _____, 20__, and entitled _____, and requesting $_____ and/or ___ additional days), and I prepared the attached Claim. I am the most

knowledgeable person at _____ *[Contractor company name]* regarding this Claim.

The attached Claim complies with all laws applicable to submission of a Claim, including but not limited to California Penal Code section 72, Government Code sections 12650 et seq. (False Claims Act), and Business and Professions Code sections 17200 et seq. (Unfair Business Practices Act). I am aware that submission or certification of false claims, or other claims that violate law or the Contract, may lead to fines, imprisonment, and/or other serious legal consequences for myself or _____ *[Contractor company name]*.

The attached Claim does not breach the Contract, is not a false claim, does not violate any applicable law, satisfies all provisions of the Contract applicable to submission of the Claim, only contains truthful and accurate supporting data, and only requests money and/or time extensions that accurately reflect the adjustments to money and time for which I believe that _____ *[public entity name]* is responsible under its Contract with _____ *[Contractor company name]*.

While preparing this declaration and Claim I consulted with others (including attorneys, consultants, or others who work for _____ *[Contractor company name]*) when necessary to ensure that the statements were true and correct.

Contractor understands and agrees that any Claim submitted without this certification does not meet the terms of the Contract Documents; that Owner, or Owner's representatives, may reject the Claim on that basis; and that unless Contractor properly and timely files the Claim with the certification, Contractor cannot further pursue the Claim in any forum and all rights to additional money or time for the issues covered by the Claim are waived due to a condition precedent not having been satisfied.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed _____, 20__, at _____, California.

_____ *[signature]*
_____ *[name of declarant]*

Contractor's failure to timely submit a certification will constitute a complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6.3) for the money or time, and (c)

initiate any action, proceeding or litigation for the money or time. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

4.5.5.2 *Claims for Additional Money*

Each Claim for additional money (including but not limited to those described in (b) and (c) of the first paragraph of Section 4.5.3) must include all facts supporting the Claim, including but not limited to all supporting documentation plus a written analysis as to (a) why the claimed cost was incurred, (b) why Contractor could not mitigate its costs, (c) why the claimed cost is the responsibility of the Owner, and (d) why the claimed cost is a reasonable amount. In no event will the Contractor be allowed to reserve its rights, whether in a Claim or other document, to assert a Claim for money at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a Claim shall be grounds for rejection of the Claim. Any costs, direct or indirect, not timely asserted in a certified Claim shall be waived. A Claim may not include any costs incurred in preparation of the Claim or in preparation of any underlying COR, including but not limited to costs of delay analysis.

4.5.5.3 *Claims for Additional Time*

4.5.5.3.1 *Notice of Extent of Claim*

If the Contractor wishes to make a Claim for an increase in the Contract Time (including but not limited to Section 4.5.3(a)), the Claim shall include, but not be limited to, all facts supporting the Claim, all documentation of such facts, all information required by the Contract Documents, all information establishing entitlement to a time extension pursuant to Section 8.4.1 below, a current and certified schedule (see Section 3.9.1, above), and a delay analysis explaining (a) the nature of the delay, (b) the Owner's responsibility for the claimed delay, (c) the claimed delay's impact on the critical path, (d) the claimed delay's impact on the date of Completion (including an analysis of any float still remaining and whether the alleged delay in work exceeds such remaining float), and (e) why Contractor could not mitigate the delay impacts. Failure to include an updated and certified schedule, or a delay analysis, in a Claim seeking a time extension will act as a complete waiver of Contractor's rights to (i) recover money or time based on the issues addressed by the Claim, (ii) submit a Government Code Claim for the requested money or time (see Section 4.5.6.4), and (iii) initiate any action, proceeding or litigation for the requested money or time, regardless of the merits; Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

In no event will the Contractor be allowed to reserve its rights, whether in a Claim or other document, to assert a Claim for a time extension at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a Claim shall be grounds for rejection of the Claim. Any time extension not timely asserted in a certified Claim shall be waived.

4.5.5.3.2 ***Unusual and Uncommon Weather Claims***

If unusual and uncommon weather is the basis for a Claim for additional time, Contractor's delay analysis (see Section 4.5.5.3.1, above) must also provide Owner data and facts showing that the weather conditions were unusual and uncommon for the period of time, could not have been reasonably anticipated or mitigated, had an adverse effect on the critical path of the scheduled construction, and meet all other Contract requirements for a time extension (including but not limited to Section 8.4.1, below).

4.5.5.4 ***Subcontractor Requests for Money or Time***

A Subcontractor or supplier to Contractor may not submit a request for additional time or money directly to the Owner due to its lack of contractual privity with Owner. If a Subcontractor or supplier submits to Contractor a request for additional money or time based on an alleged breach of the subcontract or supplier contract by Contractor, then the Subcontractor or supplier must comply with the same procedures that would apply to any Contractor request to Owner for additional money or time.

For any Contractor request to Owner for additional money or time based on a Subcontractor's or supplier's request to Contractor for additional money or time (see previous paragraph), Contractor must comply with the requirements and prerequisites in the Contract Documents for requests to the Owner for additional money or time (including but not limited to this Section 4.5 of the General Conditions) and with Public Contract Code section 9204(d)(5).

Any Claim by Contractor pursuant to the previous paragraph must include Contractor's certification (see General Conditions §4.5.5.1), a complete copy of the Subcontractor's or supplier's request for money or time (including all documents submitted by the Subcontractor or supplier), and any other necessary supporting documentation. Any such Claim by Contractor must include (a) Contractor's detailed analysis of the merit of Subcontractor's or supplier's request to the Contractor, including (i) detailed analysis of Contractor's alleged breaches of the subcontract or supplier contract that allegedly caused the Subcontractor or supplier to incur damages or delay, and (ii) detailed analysis of all of Contractor's defenses to the request for money or time by the Subcontractor or supplier; and (b) detailed analysis of the Owner's liability to Contractor for any money or time that Contractor owes, or may later be determined to owe, to Subcontractor or supplier (including but not limited to how Owner's alleged breaches of the Contract Documents caused Contractor to breach the subcontract or supplier contract). In any such Claim, Contractor may deny that it is liable to the Subcontractor or supplier for some or all of the requested money or time, or it may assert that it is merely submitting the Claim to Owner on behalf of the Subcontractor or supplier; but doing one or the other would not excuse Contractor from complying with the above requirements for its request to the Owner.

Any failure by Contractor to timely comply with this Section 4.5.5.4 (including a failure to timely submit a Notice of Potential Change, COR, Claim, certification, or detailed analysis) shall act as a complete waiver of Contractor's rights to (a) recover money or time from Owner based on any

money or time that Contractor owes, or may later be determined to owe, to the Subcontractor or supplier, (b) submit a Government Code Claim to Owner for the money or time requested by the Subcontractor or supplier (see Section 4.5.6.3), and (c) initiate any action, proceeding or litigation against Owner for any money or time that Contractor owes, or may later be determined to owe, to the Subcontractor or supplier. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

4.5.6 PROCEDURES FOR CLAIMS (PUBLIC CONTRACT CODE SECTION 9204)

Claims are subject to this section 4.5.6 and Public Contract Code section 9204, as well as the separate procedures and substantive provisions of Sections 4.5.1 through 4.5.5 and the rest of the Contract Documents. Claims of $375,000 or less are also subject to Public Contract Code sections 20104 et seq., but to the extent that one of the procedures in Sections 20104 et seq. conflicts with the procedures in Section 9204, the requirements of Section 9204 shall control.

4.5.6.1 *Claims*

The Owner shall conduct a reasonable review of the Claim and shall respond in writing to any written Claim within 45 days of receipt of the Claim. During that 45-day period, plus any extension, Owner may request, in writing, additional documentation supporting the Claim or relating to defenses to the Claim the Owner may have against the Contractor. Owner shall review any additional documentation Contractor supplies in response to that request within the 45 day, plus any extension, timeline.

After receipt of a Claim, the 45-day period may be extended by Owner and Contractor. The written response shall identify which portion of the Claim is disputed and what portion is undisputed. If Owner needs approval from its governing board to provide the written response, and the governing board does not meet within the 45 days or any extended period of time, then the Owner shall have up to three days after the next publicly noticed meeting of the governing board to provide the written response. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the Owner issues the written response. Owner's failure to respond to a Claim within the above time periods or to otherwise meet the above time requirements shall result in the Claim being deemed rejected in its entirety.

4.5.6.2 *Meet and Confer*

If the Contractor disputes the Owner's written response, or the Owner fails to respond within the time prescribed, the Contractor may so notify the Owner, in writing, either within 15 days of receipt of the Owner's response or within 15 days of the Owner's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a written demand sent by registered or certified mail return receipt requested, the Owner shall schedule an informal conference for settlement of the dispute, which shall take place within 30 days of the demand. Upon written agreement of the Owner and Contractor, the informal conference may take place during regularly scheduled

Project meetings. The informal conference is not a mediation since there is no neutral person facilitating communication to assist the parties to reach agreement; therefore, the provisions of Evidence Code sections 1115-1128 shall not apply to any portion of the informal conference (including but not limited to any documents provided or shown, or statements of fact or opinion made, by a party) unless the parties expressly agree in writing to their application. Any offer of compromise at an informal conference shall not be admissible to prove liability, as provided in Evidence Code section 1152, but this statute's prohibition of admissibility shall not apply to other statements before or at the informal conference, or in any document prepared for or exchanged at the informal conference.

If Contractor fails to timely demand an informal conference pursuant to the previous paragraph, then Contractor will have waived all rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6) for such money or time, and (c) initiate any action, proceeding or litigation for such money or time. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

Within ten (10) business days after the conclusion of the informal conference, the Owner shall give a written statement to the Contractor identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the Owner issues the written statement. Within ten (10) business days of issuance of Owner's written statement, Contractor shall identify in writing the disputed portion of the Claim that shall be submitted to non-binding mediation (which may consist of any nonbinding process, including but not limited to neutral evaluation or a dispute review board), with the Owner and Contractor sharing the costs equally. The Owner and Contractor shall mutually agree to a mediator within ten (10) business days after the Contractor has identified in writing the disputed portion of the Claim. If they cannot agree upon a mediator, then each shall select a mediator and those two mediators shall select a qualified neutral third party to mediate the disputed portion of the Claim. (Each party shall bear the fees and costs its respective mediator charged in connection with the selection of the neutral mediator). The parties may mutually waive in writing the requirement for mediation. If Contractor fails to timely notify the Owner in writing that it wishes to mediate pursuant to this paragraph, Contractor will have waived all right to further pursue the Claim pursuant to section 4.5.4. The Contractor and Owner shall reasonably cooperate to schedule and attend a mediation as soon as reasonably possible; or they may agree to postpone mediation until the Work is Complete. Owner's failure to respond to the Claim within the above time periods or to otherwise meet the above time requirements shall result in the Claim being deemed rejected in its entirety.

4.5.6.3 ***Government Code Claim***

If a Claim or any portion of it remains in dispute after the mediation and Contractor wishes to pursue it, the Contractor **must** file a timely and proper Government Code Claim. The filing of a Government Code Claim is specifically required in addition to all contractual procedures described in Sections 4.5 through 4.5.6.2. The above contractual procedures do not act as a

substitute for the Government Code Claim process, and the two sets of procedures shall be sequential with the contractual procedures occurring first.

Failure to timely file a Government Code Claim shall act as complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Government Code Claim was required, and (b) initiate any action, proceeding or litigation for such money or time. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

Owner and Contractor shall proceed with the Government Code Claim according to Government Code, Section 900 et seq., and as otherwise permitted by law. For purposes of the applicable Government Code provisions, and as provided in Public Contract Code section 20104.2(e), the running of the time period within which a Contractor must file a Government Code Claim shall commence upon accrual of a cause of action, and shall be tolled from the time the Contractor submits a written Claim under Section 4.5 until the time that the Claim is denied, in whole or in part, as a result of the meet and confer process in Section 4.5.6.2, including any period of time utilized by the meet and confer process. For these purposes, a cause of action based on a Contractor request for additional compensation or a time extension shall accrue when the Change Order Request is rejected, or deemed rejected, by the Owner (see Section 4.5.2, above); and all other causes of action shall accrue when the alleged wrongful conduct (e.g., wrongful withholding, or wrongful termination) occurred. Owner's rejection of a Claim under Sections 4.5.3-4.5.6.2, above, would not give rise to a cause of action against Owner since the Claim addressed causes of action that already had accrued before the submission of the Claim.

4.5.7 CONTINUING CONTRACT PERFORMANCE

Despite Contractor's submission of, or Owner's rejection of, a Notice of Potential Change, COR, Claim, or Government Code Claim based on alleged breaches of the Contract by Owner, the Contractor shall proceed diligently and expeditiously with performance of the Contract as directed by Owner, and the Owner shall continue to make any undisputed payments in accordance with the Contract. Contractor acknowledges that Completion of the Work is a high priority for both Owner and Contractor as failure to Complete the Work would most likely cause each of them to incur much greater costs and damages than would be incurred if the Work were Completed. If Contractor believes that Owner has breached the Contract and that such breach is preventing or delaying Contractor's performance as directed by Owner, then Contractor must submit notice as required by Section 3.18, above.

4.5.8 CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS

4.5.8.1 *Trenches or Excavations Less Than Four Feet Below the Surface*

If Contractor encounters conditions at the Site which are subsurface or otherwise concealed physical conditions, which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature, which differ materially from those ordinarily

found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall give notice to the Owner promptly before conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. If Contractor believes that such conditions differ materially and will cause an increase in the Contractor's cost of, time required for, or performance of any part of the Work, Contractor must comply with the Contract provisions for Notice of Potential Change, Change Order Request, and Claims (including but not limited to Section 4.5 of these General Conditions).

4.5.8.2 ***Trenches or Excavations Greater Than Four Feet Below the Surface***

Pursuant to Public Contract Code section 7104, when any excavation or trenching extends greater than four feet below the surface:

4.5.8.2.1 The Contractor shall promptly, and before the following conditions are disturbed, notify the public entity, in writing, of any:

(1) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law.

(2) Subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids.

(3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

4.5.8.2.2 The public entity shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a change order under the procedures described in the Contract.

4.5.8.2.3 In the event that a dispute arises between the public entity and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any deadline for Completion provided by the Contract, but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

4.5.9 Injury or Damage to Person or Property

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, any of the other party's employees or agents, or others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding ten (10) days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. For a Notice of Potential Change, COR and Claim for additional cost or time related to this injury or damage, Contractor shall follow Section 4.5.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 Subcontractor

A Subcontractor is a person or entity, who has a contract with the Contractor to perform a portion of the Work at the Site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor. To the extent that the term Trade Contractor is utilized in the Contract Documents, it shall have the same meaning as the term "Subcontractor."

5.1.2 Sub-Subcontractor

A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the Site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

5.1.3 Specialty Contractors

If a Subcontractor is designated as a "Specialty Contractor" as defined in section 7058 of the Business and Professions Code, all of the Work outside of that Subcontractor's specialty shall be performed in compliance with the Subletting and Subcontracting Fair Practices Act, Public Contract Code sections 4100, et seq.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Assignment or Substitution - Consent of Owner

In accordance with Public Contract Code sections 4107 and 4107.5, no Contractor whose bid is accepted shall, without the written consent of the Owner: substitute any person or entity as a Subcontractor in place of the Subcontractor designated in the original bid; permit any such Subcontract to be assigned or transferred, or allow it to be performed by any person or entity other than the original Subcontractor listed in the original bid; sublet or subcontract any portion of the Work in excess of one-half of one percent (0.5%) of the Contractor's total bid as to which its original bid did not designate a Subcontractor. Any assignment or substitution made without the prior written consent of the awarding authority shall be void, and the assignees shall acquire no rights in the Contract. Any consent, if given, shall not relieve Contractor or its Subcontractors from their obligations under the terms of the Contract Documents.

5.2.2 Grounds for Substitution

Pursuant to Public Contract Code section 4107 and the procedure set forth therein, no Contractor whose bid is accepted may request to substitute any person or entity as a Subcontractor in place of a Subcontractor listed in the original bid except in the following instances:

A. When the Subcontractor listed in the bid after having a reasonable opportunity to do so, fails or refuses to execute a written contract for the scope of work specified in the subcontractor's bid and at the price specified in the subcontractor's bid, when that written contract, based upon the general terms, conditions, plans and specifications for the Project involved or the terms of that Subcontractor's written bid, is presented to the Subcontractor by the Contractor;

B. When the listed Subcontractor becomes insolvent or the subject of an order for relief in bankruptcy;

C. When the listed Subcontractor fails or refuses to perform his or her Subcontract;

D. When the listed Subcontractor fails or refuses to meet the bond requirements of the prime contractor set forth in Public Contract Code section 4108.

E. When the Contractor demonstrates to the awarding authority, or its duly authorized officer, subject to the further provisions of Public Contract Code section 4107.5, that the name of the Subcontractor was listed as the result of inadvertent clerical error;

F. When the listed Subcontractor is not licensed pursuant to the Contractors License Law; or

G. When the awarding authority, or its duly authorized officer, determines that the Work being performed by the listed Subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or the Subcontractor is substantially delaying or disrupting the progress of the Work.

H. When the listed Subcontractor is ineligible to work on a public works project pursuant to Section 1777.1 of the Labor Code.

I. When the awarding authority determines that a listed Subcontractor is not a responsible contractor.

5.2.2.1 ***No Change in Contract.*** Any substitutions of Subcontractors shall not result in any increase in the Contract Sum or result in the granting of any extension of time for a Milestone Deadline or the Completion of the Work.

5.2.2.2 ***Substitution Due to Clerical Error.*** The Contractor, as a condition of asserting a claim of inadvertent clerical error in the listing of a Subcontractor, shall, pursuant to Public Contract Code section 4107.5, within two (2) working days after the time of the prime bid opening by the awarding authority, give written notice to the awarding authority and copies of such notice to both the Subcontractor it claims to have listed in error, and the intended Subcontractor who had bid to the Contractor prior to bid opening. Any listed Subcontractor who has been notified by the Contractor in accordance with the provisions of this section as to an inadvertent clerical error, shall be allowed six (6) working days from the time of the prime bid opening within which to submit to the awarding authority and to the Contractor written objection to the Contractor's claim of inadvertent clerical error.

In all other cases, the Contractor must make a request in writing to the awarding authority for the substitution of a subcontractor, giving reasons therefore. The awarding authority shall mail a written notice to the listed Subcontractor giving reasons for the proposed substitution. The listed Subcontractor shall have five (5) working days from the date of such notice within which to file with the awarding authority written objections to the substitution.

Failure to file written objections pursuant to the provisions of this section within the times specified herein shall constitute a complete waiver of objection to the substitution by the listed Subcontractor and, where the ground for substitution is an inadvertent clerical error, an agreement by the listed Subcontractor that an inadvertent clerical error was made.

If written objections are filed, the awarding authority shall give five (5) days notice to the Contractor and to the listed Subcontractor of a hearing by the awarding authority on the Contractor's request for substitution as provided in Public Contract Code section 4107. The determination by the awarding authority shall be final.

5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all obligations and responsibilities, which the Contractor, by the Contract Documents, assumes toward the Owner. Each subcontract agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

A. Assignment is effective only after termination of the Contract with the Contractor by the Owner for cause pursuant to Article 14 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and

B. Assignment is subject to the prior rights of the surety, if any, obligated under any bond relating to the Contract.

5.5 SUBCONTRACTOR'S RESPONSIBILITIES

Every Subcontractor is bound to the following provisions, unless specifically noted to the contrary in the Subcontractor's contract subject to the limitations of section 5.3.

5.5.1 Supervision by Subcontractors

Subcontractors shall efficiently supervise their Work, using their best skill and attention. Each of them shall carefully study and compare all Drawings, Specifications, and other instructions, shall at once report to Contractor any error or omission which any of them may discover, and shall

subsequently proceed with the Work in accordance with instructions from the Contractor concerning such error or omission. Each Subcontractor shall be fully responsible for and shall bear the full risk of loss of all of its property.

5.5.2 Discipline and Order

Each Subcontractor shall at all times enforce strict discipline and good order among its Subcontractors, material or equipment suppliers, or their agents, employees, and invitees, and shall establish and maintain surveillance over the activities of each of the foregoing to minimize any disturbance, damage, pollution, or unsightly conditions relative to property areas adjacent to or in the vicinity of the Site. The Contractor shall have the right to remove from the Work any employee of a Subcontractor for any reason including, without limitation, incompetence or carelessness.

5.5.3 Defects Discovered

Should the proper and accurate performance of the Work depend upon the proper and accurate performance of other work not included in its Contract, each Subcontractor shall use all necessary means to discover any defect in such other work and shall allow the Contractor, the Owner and Architect, or other Subcontractors as Contractor elects, a reasonable amount of time to remedy such defects. If the Subcontractor should proceed with its Work, it shall be considered to have accepted such other work, unless the Subcontractor shall have proceeded pursuant to instructions in writing by the Contractor over its written objection.

5.5.4 Subcontractor Information

Each Subcontractor shall submit to the Owner, the Contractor, or the Architect, as the case may be, promptly when requested by any of the foregoing, information with respect to the names, responsibilities, and titles of the principal members of its staff, the adequacy of the Subcontractor's equipment and the availability of necessary materials and supplies. Subcontractor shall fully cooperate with Contractor in its periodic review of the adequacy of Subcontractor's supervision, personnel, and equipment, and the availability of necessary materials and supplies and shall promptly comply with the requirements of the Contractor with respect thereto.

5.5.5 Temporary Structures

Each Subcontractor shall furnish at its expense its own temporary facilities and storage except those specifically agreed to be furnished to it by the Contractor in the Subcontract Agreement. Subcontractor's material storage rooms and field offices, etc., will be placed in locations designated by the Contractor. When it becomes necessary due to the progress of the Work for the Subcontractor to relocate its field operations, it will do so in an expeditious manner and at no additional cost to Contractor or Owner. The construction of material storage rooms and field offices, etc., will be of fire resistive material only, such as concrete or gypsum block, rated

drywall, or sheet metal.

5.5.6 Charges to Subcontractor

Each Subcontractor may be subject to the Contractor's reasonable charges for hoisting, repair to other work caused by the fault or negligence of Subcontractor, removal of Subcontractor's rubbish, and clean-up occasioned by Subcontractor.

5.5.7 Fines Imposed

Subcontractor shall comply with and pay any fines or penalties imposed for violation of any applicable law, ordinance, rule, regulation, Environmental Impact Report mitigation requirement, and lawful order of any public authority, including, without limitation, all OSHA and California OSHA requirements and those of other authorities having jurisdiction of the safety of persons or property.

5.5.8 Project Signs

Each Subcontractor shall not display on or about the Project any sign, trademark, or other advertisement. The Owner will permit a single Project sign, which shall be subject to the Owner's prior and sole discretion and approval, as to all matters including, without limitation, size, location, material, colors, style and size of printing, logos and trademarks (if any), text, and selection of names to be displayed.

5.5.9 Remedies for Failure to Perform

Without limitation of any other right or remedy available to Contractor under the Contract Documents or at law, should: the Subcontractor fail to perform its portion of the Work in a skilled and expeditious manner in accordance with the terms of the Contract Documents with sufficient labor, materials, equipment, and facilities; delays the progress of the job or otherwise fail in any of its obligations; or either a receiver is appointed for the Subcontractor or the Subcontractor is declared to be bankrupt or insolvent, and such appointment, bankruptcy, or insolvency proceedings or declaration is not set aside within thirty (30) days, then the Contractor, upon three (3) days notice to the Subcontractor (subject to the requirements of Pub. Contracts Code, § 4107), may provide such labor, materials, or perform such work and recover the cost plus profit and overhead from monies due or to become due thereafter to the Subcontractor. The Contractor may terminate the employment of the Subcontractor, taking possession of its tools, materials, and equipment related to the Work and cause the entire portion of the Subcontractor's Work to be finished either by another Subcontractor or through the Contractor's own forces.

5.5.10 Disputes Not to Affect Work

In the event of any dispute as to whether or not any portion of the Work is within the scope of

the Work to be performed by a Subcontractor, or any dispute as to whether or not the Subcontractor is entitled to a Change Order for any Work requested of it or entitled to payment, the Subcontractor shall continue to proceed diligently with the performance of the Work. Regardless of the size or nature of the dispute, the Subcontractor shall not under any circumstances cease or delay performance of its portion of the Work during the existence of the dispute. The Contractor shall continue to pay the undisputed amounts called for under the Subcontract Agreement during the existence of the dispute. Any party stopping or delaying the progress of the Work because of a dispute shall be responsible in damages to the Owner, the Architect, and the Contractor for any losses suffered as a result of the delay.

5.5.11 **Application for Payment**

Contractor agrees to advise the Subcontractor if any documentation in connection with the Subcontractor's application for payment has not been accepted or is in any way unsatisfactory.

5.5.12 **Compliance with Procedures**

Each Subcontractor shall comply with all procedures established by the Contractor for coordination among the Owner, the Owner's consultants, Architect, Contractor, and the various Subcontractors for coordination of the Work with all local municipal authorities, government agencies, utility companies, and any other agencies with jurisdiction over all or any portion of the Work. The Subcontractor shall cooperate fully with all of the foregoing parties and authorities.

5.5.13 **On-Site Record Keeping**

Subcontractor shall comply with all on-Site record keeping systems established by the Contractor and shall, upon the request of the Contractor, provide the Contractor with such information and reports as the Contractor may deem appropriate. Without limitation of the foregoing, the Subcontractor shall assemble all required permits and certificates so that they are readily accessible at the Site.

5.5.14 **Non-Exclusive Obligations**

The specific requirements of Article 5 are not intended to exclude the obligation of the Subcontractor to comply with any of the other provisions of the General Conditions and the other Contract Documents which are relevant to the proper performance of its portion of the Work.

ARTICLE 6

CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE

CONTRACTS

6.1.1 Owner's Rights

The Owner reserves the right to perform Project work related to the Contract with the Owner's own forces, or to award separate contracts in connection with such other work or other construction or operations on the Site under conditions of the Contract identical or substantially similar to these including those portions related to insurance. Upon the election to perform such work with its own forces or by separate contracts, the Owner shall notify the Contractor. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall proceed pursuant to Section 4.5 in the Contract Documents.

6.1.2 Designation as Contractor

When separate contracts are awarded for different portions of the Project or other construction or operations on the Site, the term "Contractor" in the Contract Documents in each of those contracts shall mean the contractor who executes each separate Owner/Contractor agreement.

6.1.3 Contractor Duties

Although the Owner shall have overall responsibility for coordination and scheduling of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, Contractor shall cooperate with Owner. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor until subsequently revised.

6.1.4 Owner Obligations

Unless otherwise provided in the Contract Documents, when the Owner performs work related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations, and to have the same rights, which apply to the Contractor under the General Conditions, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10 and 12.

6.2 MUTUAL RESPONSIBILITY

6.2.1 Delivery and Storage

The Contractor shall afford the Owner and separate contractors reasonable opportunity for delivery and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the separate contractors' construction and operations with theirs as required by the Contract Documents.

6.2.2 Notice by Contractor

If part of the Contractor's Work depends upon proper execution or results from work by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Owner patent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the Owner's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 Costs Incurred

Costs, expenses, and damages caused by delays, improperly timed activities, defective construction, or damages to another's work/Work or property shall be borne by the party responsible. Should Contractor cause damage to the work or property of any other contractor on the Project, or to the Project or the property of a third party, or cause any delay to any such contractor or third party, the Contractor shall defend, indemnify and hold Owner harmless for such damage or delay under Section 3.16, above. Owner may withhold from progress payments and/or retention for the cost of such damage or delay.

6.2.4 Correction of Damage

The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors.

6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Section 3.13, the Owner may clean up and allocate the cost among those responsible as the Owner determines to be just.

ARTICLE 7

CHANGES IN THE WORK

7.1 CHANGES

7.1.1 No Changes Without Authorization

The Owner reserves the right to change the Work by making such alterations, deviations, additions to, or deletions from the plans and specifications, as may be deemed by the Owner to be necessary or advisable for the proper Completion or construction of the Work contemplated, and Owner reserves the right to require Contractor to perform such work. No adjustment will be made in the Contract unit price of any Contract item regardless of the quantity ultimately required.

Owner shall compensate Contractor with additional money or additional time, or both, as warranted under the Contract Documents for any extra work ordered by the Owner to be performed by Contractor; but such "extra work" shall not include any work or expense (a) that was known by, should have been known by, or was reasonably foreseeable to Contractor at the time of bidding, or (b) for which Contractor is responsible under the Contract Documents. Contractor shall follow the provisions of the Contract Documents, including General Conditions sections 4.5, 7.6, 7.7, and 8.4, when requesting additional money or additional time for such extra work. Contractor shall diligently and expeditiously perform all extra work upon direction, even if no agreement has been reached on extra time or money. For all such changes resulting in a credit to Owner, Contractor shall follow Sections 7.5 and 7.7 in providing the credit to Owner. Contractor shall bring all potential credits to the Owner's attention.

There shall be no change whatsoever in the drawings, specifications, or in the Work under the Contract Documents without an executed Change Order, Construction Change Directive, or order by the Owner pursuant to Section 7.1.2. Owner shall not be liable for the cost or time of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the same shall have been properly requested under the Contract Documents.

Owner shall not be liable for, and Contractor shall bear the burden of, any post-proposal escalation in the costs of construction, whether foreseeable or not; but Contractor will retain the benefit of any post-proposal cost decreases, whether foreseeable or not, and retain the right to request additional compensation for cost increases incurred due to Owner delay.

The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications.

7.1.2 Authority to Order Minor Changes

The Owner has authority to order minor changes in the Work not involving any adjustment in the Contract Sum, an extension of the Contract Time, or a change which is inconsistent with the intent of the Contract Documents. Such changes shall be effected by written Construction Change Directive and shall be binding on the Contractor. The Contractor shall carry out such written orders promptly.

7.2 CHANGE ORDERS ("CO")

A CO is a written instrument signed by the Owner and the Contractor, stamped (or sealed) and signed by Architect, and approved by the Owner's Governing Board and DSA, stating the agreement of Owner and Contractor upon all of the following:

A. A change in the Work;

B. The amount of the adjustment in the Contract Sum, if any; and

C. The extent of the adjustment in the Contract Time, if any.

Unless expressly stated otherwise in the CO, any CO executed by Owner and Contractor constitutes and includes full and complete money and time (including but not limited to, adjustments to money and time) for all costs and effects caused by any of the changes described within it. Unless expressly stated otherwise in the CO, in consideration for the money received for the changes described in the CO, Contractor waives all Claims for all costs and effects caused by any of the changes, including but not limited to labor, equipment, materials, delay, extra work, overhead (home and field), profit, direct costs, indirect costs, acceleration, disruption, impaired productivity, time extensions, and any the costs and effects on Subcontractors and suppliers of any tier.

7.3 CONSTRUCTION CHANGE DIRECTIVES ("CCD")

7.3.1 Definition

A CCD is a written unilateral order to Contractor signed by the Owner and directing performance of the Work or directing a change in the Work. Any adjustment of the Contract Sum, Contract Time, or Milestone Deadline stated in the CCD is not binding on the Owner without a valid CO or an executed approval of allowance expenditure. The Owner may by CCD, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions pursuant to Section 7.1.1.

7.3.2 Use to Direct Change

A CCD may be used by Owner in the absence of agreement on the terms of a CO. If Contractor

disagrees with the terms of a CCD, it shall nevertheless perform the work directed by the CCD; and if Contractor believes it is entitled to changes in the Contract Sum or Contract Time, it must comply with the Notice of Potential Change, COR and Claim procedures of Section 4.5.

7.4 REQUEST FOR INFORMATION ("RFI")

7.4.1 Definition

An RFI is a written request prepared by the Contractor asking the Owner to provide additional information necessary to clarify an item which the Contractor feels is not clearly shown or called for in the drawings or specifications, or to address problems which have arisen under field conditions.

7.4.2 Scope

The RFI shall reference all the applicable Contract Documents including specification section, detail, page numbers, drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and/or interpretations of the issue raised by the RFI. An RFI cannot modify the Contract Sum, Contract Time, or the Contract Documents.

7.4.3 Response Time

Unless Owner expressly directs otherwise in writing, Contractor shall submit RFIs directly to the Architect, with copies forwarded to the Owner. Contractor shall submit a revised and updated priority schedule with each RFI. The Architect shall endeavor to follow the Contractor's requested order of priorities. The Owner and Contractor agree that an adequate time period for the Architect (or other designated recipient of the RFI) to respond to an RFI is generally fourteen (14) calendar days after the Architect's receipt of an RFI, unless the Owner and Contractor agree otherwise in writing. However, in all cases, the Architect shall take such time, whether more or less than 14 days, as is necessary in the Architect's professional judgment to permit adequate review and evaluation of the RFI. If Contractor informs the Architect that it needs a response to an RFI expedited to avoid delay to the critical path, the Architect shall provide a response as quickly as reasonably possible. The total time required for the Architect to respond is subject to the complexity of the RFI, the number of RFI's submitted concurrently and the reprioritization of pending RFI's submitted by the Contractor, among other things. If Contractor believes that the Architect's response results in a change in the Work that warrants additional money or time, or that Architect's response was unreasonably delayed and caused delay to the Work's critical path, Contractor shall follow the procedures for additional money or time under Section 4.5. No presumption shall arise as to the timeliness of the response if the response is more than fourteen (14) days after the Architect's receipt of the RFI. Contractor shall review the Contract Documents before submitting an RFI to ensure that the information is not already in the Contract Documents. To compensate the Owner for time and costs incurred for each time the information was already in the Contract Documents, Owner may withhold $100 from progress payments or retention in addition to any other remedies which Owner may have the

right to pursue.

7.4.4 Costs Incurred

The Contractor shall be invoiced by the Owner for any costs incurred for professional services, which shall be withheld from progress payments or retention, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request.

7.5 REQUEST FOR PROPOSAL ("RFP")

7.5.1 Definition

An RFP is Owner's written request asking the Contractor to submit to the Owner an estimate of the effect, including credits, of a proposed change on the Contract Sum and the Contract Time.

7.5.2 Scope

An RFP shall contain adequate information, including any necessary drawings and specifications, to enable Contractor to provide the cost breakdowns required by section 7.7. The Contractor shall not be entitled to any additional money for preparing a response to an RFP, whether ultimately accepted or not.

7.6 CHANGE ORDER REQUEST ("COR")

7.6.1 Definition

A COR (including but not limited to a "proposed change order" or "PCO") is any written request submitted by the Contractor asking the Owner for a change in the Contract Documents, including a request for additional money or time. However, a Claim (see Sections 4.5.3-4.5.6) is not a COR. See Section 4.5.2 for additional COR requirements. The COR shall include all information necessary to establish the Contractor's entitlement to the requested change.

7.6.2 Changes in Price

Where a COR requests a change in the Contract Sum, the COR shall also include all information required by the Contract Documents, including but not limited to Sections 4.5.5.2 and 7.7 of these General Conditions. A COR shall include breakdowns per Section 7.7 to validate any proposed change in Contract Sum.

7.6.3 Changes in Time

Where a COR requests a time extension in order to change a Milestone Deadline or the Contract Time, the COR shall also include delay analysis to validate any proposed change, and

shall meet all requirements in the Contract Documents, including but not limited to Sections 4.5.5.3 and 8.4 of these General Conditions. Any additional time requested shall not be based on the number of days to perform changed Work, but must be based on the impact to the Work schedule as defined in Sections 3.9 and 8.4.1.

7.7 PRICE OF CHANGE ORDERS

7.7.1 Scope

Any COR shall provide in writing to the Owner, the Architect and any construction manager, the effect of the proposed CO upon the Contract Sum and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit prices, wage rates, required for the change, and the effect upon the Contract Time of such CO.

7.7.2 Determination of Cost

The amount of the increase or decrease in the Contract Sum resulting from a CO, if any, shall be determined in one or more of the following ways as applicable to a specific situation:

A. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

B. Unit prices stated in the Contractor's original bid, the Contract Documents, or subsequently agreed upon between the Owner and the Contractor;

C. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

D. By cost of material and labor and percentage of overhead and profit. If the value is determined by this method the following requirements shall apply:

1. **Daily Reports by Contractor**.

a) General: At the close of each working day, the Contractor shall submit a daily report to the Inspector of Record and any construction manager, on forms approved by the Owner, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, the location of the work, and for other services and expenditures when authorized concerning extra work items. An attempt shall be made to reconcile the report daily, and it shall be signed by the Inspector of Record and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by Subcontractors or others shall be

submitted through the Contractor.

b) Labor: Show names of workers, classifications, and hours worked.

c) Materials: Describe and list quantities of materials used.

d) Equipment: Show type of equipment, size, identification number, and hours of operation, including, if applicable, loading and transportation.

e) Other Services and Expenditures: Describe in such detail as the Owner may require.

2. **Basis for Establishing Costs**.

a) Labor will be the actual cost for wages prevailing locally for each craft or type of workers at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. The use of a labor classification, which would increase the extra work cost, will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

b) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery.

The Owner reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the Owner.

c) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $100 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the work is performed.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Necessary loading and transportation costs for equipment used on the extra work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the Owner than holding it at the work Site, it shall be returned unless the Contractor elects to keep it at the work Site at no expense to the Owner.

All equipment shall be acceptable to the Inspector of Record, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and modifications shall be used to classify equipment, and equipment shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

d) Other Items. The Owner may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted with the Application for Payment.

e) Invoices. Vendors' invoices for material, equipment rental, and other expenditures shall be submitted with the COR. If the Application for Payment is not substantiated by invoices or other documentation, the Owner may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.

f) Overhead and profit. For overhead, including direct and indirect costs, submit documentation with the COR for all such costs. Overhead costs include, but are not limited to, job site or field overhead costs (including job site or field office), home office overhead costs, insurance costs, administrative costs, Site superintendent costs, general foreman costs, vehicle costs, cleaning costs, off-Site supervision, COR and CO preparation, negotiation, and research costs for Owner-initiated changes, delay costs, project interference and disruption costs, additional guaranty and warranty duration costs, additional temporary protection costs, additional temporary utilities costs, additional material handling costs, additional safety equipment costs, and any other costs for supplies, equipment, facilities or services not physically incorporated into the extra work or Work to be performed but necessary for completion of the extra work or Work. For extra work performed by the Contractor, the maximum markup for overhead and profit is 15% of the total of its materials, labor, and equipment costs (see above). For extra work performed by a subcontractor, that subcontractor's maximum markup for overhead and profit is 15% of the total of its materials, labor, and equipment costs (see above); and the maximum markup for overhead and profit that may be applied by the Contractor (or applied by any subcontractor in a tier higher

than the subcontractor that performed the extra work) is 5% of the total submitted to the Contractor (or the total submitted to any higher tier subcontractor).

7.7.3 Format for Proposed Cost Change

The following format shall be used as applicable by the Owner and the Contractor to communicate proposed additions and deductions to the Contract.

	EXTRA	CREDIT
A. Material (attach itemized quantity and unit cost plus sales tax, invoices, receipts, truck tags, etc., for force account work)	_____	_____
B. Labor (attach itemized hours and rates, daily logs, certified payroll, etc.)	_____	_____
C. Equipment (attach any invoices)	_____	_____
D. Subtotal	_____	_____
E. If Subcontractor performed Work, then add Subcontractor's overhead and profit to portions performed by Subcontractor, not to exceed fifteen percent (15%) of Subcontractor's portions.	_____	_____
F. Worker's Compensation Insurance, Social Security, and Unemployment Taxes, not to exceed twenty-five percent (25%) of Item B.	_____	_____
G. Subtotal	_____	_____
H. General Contractor's Overhead and Profit for the portion of the Work in Item G performed by subcontractors, not to exceed five percent (5%).	_____	_____

I. General Contractor's Overhead and Profit for the portion of the Work in Item G performed by Contractor, not to exceed fifteen percent (15%).	_____	_____
J. Subtotal	_____	_____
K. Bond premium increase (not to exceed one percent (1%) of Item J).	_____	_____
L. TOTAL	_____	_____

For any claimed overhead costs (whether field overhead (i.e., general conditions costs) or home office overhead) pursuant to Section 8.4.2 below, Contractor may not recover any mark ups for overhead or profit.

It is expressly understood that the value of such extra work or changes, as determined by any of the aforementioned methods, expressly includes (1) any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the project or resulting from delay to the project, and (2) any costs of preparing a COR, including but not limited to delay analysis. Any costs or expenses not included are deemed waived.

7.7.4 Discounts, Rebates, and Refunds

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omissions in the Work as provided herein.

7.7.5 Accounting Records

With respect to portions of the Work performed by COs and CCDs on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records satisfactory to the Owner, which shall be available to the Owner on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

7.7.6 Notice Required

Contractor shall submit a written Notice of Potential Change for additional money or time pursuant to section 4.5.1.

7.7.7 Applicability to Subcontractors

Any requirements under this Article 7 shall be equally applicable to COs or CCDs issued to Subcontractors by the Contractor to the same extent required of the Contractor.

7.8 Waiver of Right to Claim Money or Time

Failure to demand money based on costs, or time extensions, as part of a COR constitutes a complete waiver of Contractor's right to claim the omitted money or time. All money or time for an issue must be included in the COR at the time submitted.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 Contract Time

Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Completion of the Work.

8.1.2 Notice to Proceed

Contractor shall not commence the Work until it receives a Notice to Proceed from Owner. The date of commencement of the Work is the date established in the Notice to Proceed. The date of commencement shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

8.1.3 Days

The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.2 HOURS OF WORK

8.2.1 Sufficient Forces

Contractors and Subcontractors shall furnish sufficient forces to ensure the prosecution of the Work in accordance with the Baseline Schedule, including Work directed pursuant to a CCD (see Section 7.3, above).

8.2.2 Performance During Working Hours

Work shall be performed during regular working hours except that in the event of an emergency or when required to perform the Work in accordance with job progress, Work may be performed outside of regular working hours with the advance written consent of the Owner.

8.2.3 Labor Code Application

As provided in Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the Contractor or by any Subcontractor on any subcontract under this Contract, upon the Work or upon any part of the Work contemplated by this Contract, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, Work performed by employees of Contractors in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon this public work with compensation provided for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

Contractor or subcontractor shall pay to the Owner a penalty of Twenty-five Dollars ($25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one (1) calendar week, in violation of the provisions of Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half (1-1/2) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

8.2.4 Costs for After Hours Inspections

If the work done after hours is required by the Contract Documents to be done outside the Contractor's or the Inspector of Record's regular working hours, the costs of any inspections, if required to be done outside normal working hours, shall be borne by the Owner.

If the Owner allows the Contractor to do work outside regular working hours for the Contractor's own convenience, the costs of any inspections required outside regular working hours, among other remedies, shall be invoiced to the Contractor by the Owner and withheld from progress payments and/or retention. Contractor shall give Owner at least 48 hours notice prior to working outside regular working hours.

If the Contractor elects to perform work outside the Inspector of Record's regular working hours, costs of any inspections required outside regular working hours, among other remedies, may be invoiced to the Contractor by the Owner and withheld from progress payments and/or retention.

8.2.5 Time for Commencement By Subcontractors

Unless otherwise provided in the Contract Documents, all Subcontractors shall commence their Work within two (2) consecutive business days after notice to them by the Contractor and shall prosecute their Work in accordance with the progress of the Work.

8.3 PROGRESS AND COMPLETION

8.3.1 Time of the Essence

Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Milestone Deadlines and Contract Time are reasonable periods for performing the Work.

8.3.2 No Commencement Without Insurance

The Contractor shall not knowingly, except by agreement or instruction of the Owner, in writing, commence operations on the Site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.

8.3.3 Expeditious Completion

The Contractor shall perform the Work diligently and expeditiously, including Work directed pursuant to a CCD (see Section 7.3, above), with adequate forces, labor, materials, equipment, services and management, shall achieve all Milestone Deadlines, and shall achieve Completion within the Contract Time.

8.4 EXTENSIONS OF TIME - LIQUIDATED DAMAGES

Contractor waives all rights and remedies as to any delay experienced during the Work (including any right to rescind the Contract and any right to refuse to perform the Contract) except for the rights and remedies expressly allowed by the Contract (including but not limited to time extensions and delay damages pursuant to this Section 8.4.1 and Section 8.4.2 below, and termination pursuant to Section 14.1 below).

8.4.1 Conditions Allowing for Extensions of Time to Complete the Work Only (Excusable Delay)

The Contractor shall be granted a reasonable time extension under the Contract Documents, including but not limited to Sections 3.18 and 4.5 and Article 7, for excusable delays, which are those delays that meet each and every of the following conditions:

(a) The delay was beyond the control of Contractor and its subcontractors and material suppliers;

(b) The delay was caused by events that were not reasonably foreseeable to Contractor at the time of bidding;

(c) All float in the schedule had been used, and the delay impacted and delayed the controlling items of Work (i.e., the as-built critical path, as determined from a comparison of the Baseline Schedule and the actual progress of the Work), thus delaying the achievement of a Milestone Deadline or the Completion of the whole Work within the Contract Time;

(d) The delay was not caused by Contractor or its subcontractors or suppliers, including but not limited to their breaches of contract or the standard of care;

(e) The delay was not associated with loss of time resulting from untimely submittals to Owner for approval, and was not associated with surveys, measurements, inspections, or testing caused by Contractor's acts or omissions;

(f) The delay was not caused by usual or common weather for the time of year, including usual or common severe weather; and

(g) The delay could not have been prevented or mitigated by the exercise of care, prudence, foresight, and diligence by Contractor.

Excusable delays may include acts of God, acts of public enemy, acts of the Owner or anyone employed by it, acts of another contractor in performance of a contract (other than this Contract) with the Owner, fires, floods, epidemics, quarantine restrictions, labor disputes, unusual and uncommon weather for the time of year, unusual and uncommon delays by utility companies, unusual and uncommon delays by other government agencies, unforeseen site conditions, or delays of subcontractors due to such causes. Owner shall take into consideration other relevant factors such as concurrent delays. Contractor has the burden of proving that any delay was excusable.

Information or services under Owner's control will be furnished by the Owner with reasonable promptness. The Owner shall not be liable for any time extensions caused by factors that Contractor knew, or reasonably should have known, at the time of bidding (such as usual or common weather, usual or common delays by utility companies, or usual or common delays by other government agencies, which Contractor should have included in its Baseline Schedule; see Section 3.9.1, above).

8.4.2 Compensable Delay (Time and Money)

Compensable delays are those excusable delays for which Contractor is also entitled to money. To be compensable, an excusable delay must be one for which the Owner is responsible, where the delay was unreasonable under the circumstances involved, and where the delay was not within the contemplation of the parties; ***however***, Contractor shall not be entitled to monetary compensation when (a) Contractor could have reasonably anticipated the delay and avoided or minimized the cost impacts of it, (b) there was a concurrent delay which does not qualify for

monetary compensation under this paragraph, (c) the cause of the delay was reasonably unforeseen by the Owner, including but not limited to differing site conditions that were not known to Owner at the time of bidding; (d) the delay was caused by factors beyond the control of the Owner, including but not limited to a delay caused by a utility company's failure to perform despite Owner's reasonable arrangements for such performance, or a delay caused by another government agency; or (e) any other defense available to Owner under law or equity applies. Contractor has the burden of proving that any delay was excusable and compensable, including an analysis that establishes non-concurrency. Compensation shall be limited to field overhead (i.e., general conditions) and home office overhead, as may be allowed by law.

8.4.3 Notice by Contractor Required; Procedures for Demanding Additional time or money

For notice and other required procedures related to requests by Contractor for additional time or money related to delay, Contractor shall comply with the Contract Documents, including but not limited to Sections 3.18 and 4.5, and Article 7, above.

8.4.4 Early Completion

Regardless of the cause therefore, the Contractor may not maintain any Claim or cause of action against the Owner for damages incurred as a result of its failure or inability to Complete its Work on the Project in a shorter period than established in the Contract Documents, the parties stipulating that the period set forth in the Contract Documents is a reasonable time within which to perform the Work on the Project.

8.4.5 Liquidated Damages

Failure to Complete the Work within the Contract Time and in the manner provided for by the Contract Documents, or failure to complete any specified portion of the Work by a milestone deadline, shall subject the Contractor to liquidated damages as described in Article III of the Agreement and the Contract Documents. Accordingly, the parties agree that the amount set forth in the Agreement shall be presumed to be the amount of damages which the Owner shall directly incur as a result of each calendar day by which Completion of the Work is delayed beyond the Contract Time as adjusted by Change Orders.

In addition, delaying another contractor's work on the Project or causing delay to the *completion* of the Project shall subject the Contractor to liquidated damages as described in Article III of the Agreement and the Contract Documents. Accordingly, the parties agree that the amount set forth in the Agreement shall be presumed to be the amount of damages which the Owner shall directly incur as a result of each calendar day by which Contractor delays the work of others on the Project or *completion* of the Project itself.

If liquidated damages accrue as described above, the Owner, in addition to all other remedies provided by law, shall have the right to assess and withhold as provided in Article III of the

Agreement and the Contract Documents.

8.5 Government Approvals

Owner shall not be liable for any damages or time extensions related to the time required to obtain government approvals, except as may be allowed above.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement, later adjusted by Change Orders and Construction Change Directives, and is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2 COST BREAKDOWN

9.2.1 Required Information

On forms approved by the Owner, the Contractor shall furnish the following:

A. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, a detailed breakdown of the Contract Sum (Schedule of Values) for the Work. Each item in the schedule of values shall include its proper share of the overhead and profit.

B. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, a schedule of estimated monthly payment requests (cash flow) due the Contractor showing the values and construction time of the various portions of the Work to be performed by it and by its Subcontractors or material and equipment suppliers containing such supporting evidence as to its correctness as the Owner may require;

C. Five (5) days prior to the submission of a pay request, an itemized breakdown of work done for the purpose of requesting partial payments;

D. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, the name, address, telephone number, fax number, license number and classification, and (for all projects over Twenty-Five Thousand Dollars ($25,000)) the public works contractor registration number of all of its Subcontractors and of all other parties furnishing labor, material, or equipment for its Contract, along with the amount of each such subcontract or the price of such

labor, material, and equipment needed for its entire portion of the Work.

9.2.2 **Owner Acceptance Required**

The Owner shall review all submissions received pursuant to paragraph 9.2.1 in a timely manner. All submissions must be accepted by the Owner before becoming the basis of any payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 **Procedure**

On or before the fifth (5th) day of each calendar month during the progress of the portion of the Work for which payment is being requested, the Contractor shall submit to the Architect, unless there is a construction manager for the Project or the Owner directs otherwise, an itemized application for payment for operations completed in accordance with the Schedule of Values through the end of the previous calendar month ("Application for Payment"). Such application shall be notarized, if required, and supported by the following:

A. The amount paid to the date of the Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;

B. The amount being requested with the Application for Payment by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;

C. The balance that will be due to each of such entities after said payment is made;

D. A certification that the Record Drawings and Annotated Specifications are current;

E. The Owner approved additions to and subtractions from the Contract Sum and Time;

F. A summary of the retentions (each Application shall provide for retention, as set out in Article 9.6);

G. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the Owner may require from time to time;

H. The percentage of Completion of the Contractor's Work by line item;

I. A statement showing all payments made by the Contractor for labor and materials on account of the Work covered in the preceding Application for Payment. Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to subcontractors or others because of a dispute or other reason;

J. Conditional and unconditional waivers and releases in exchange for progress payments, including final progress payments, in compliance with Civil Code sections 8132-8138; and

K. Contractor's Schedule Updates, daily reports, and monthly reports for all months of Work prior to the Application for Payment that Contractor has not previously submitted.

9.3.2 Purchase of Materials and Equipment

As the Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from Owner, to assure that there will be no delays, payment by the Owner for stored material shall be made only in unusual circumstances where the Architect specifically recommends, and Owner specifically approves the payment in writing. If payments are to be made on account of materials and equipment not incorporated in the Work, but delivered and suitably stored at the Site or at some other location agreed upon in writing by the Owner, the payments shall be conditioned upon submission by the Contractor, Subcontractor, or vendor of bills of sale and such other documents satisfactory to the Owner to establish the Owner's title to such materials or equipment free of all liens and encumbrances, and otherwise protect the Owner's interest, including, without limitation, provision of applicable insurance and transportation to the Site. All stored items shall be inventoried, specified by identification numbers (if applicable), released to the Owner by sureties of the Contractor and the Subcontractor and, if stored off-Site, stored only in a bonded warehouse.

9.3.3 Warranty of Title

The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work. Transfer of title to Work does not constitute a waiver by Owner of any defects in the Work.

9.4 REVIEW OF PROGRESS PAYMENT

9.4.1 Owner Acceptance

The Owner will, within seven (7) days after receipt of an Application for Payment, review the Application to determine whether it is a proper payment request. If the Owner determines that the Application is not a proper payment request, then the Owner shall return the Application within seven (7) days after receipt of it accompanied by a document setting forth the reasons why the payment request is not proper (including but not limited to inclusion of change orders that have not been finalized, incorrect calculations of the amount to be paid, incorrect percentages of completion in the schedule of values, and failure to submit all documents required by Section 9.3 above). The Owner may return an improper Application more than seven (7) days after receipt, but it may affect the accrual of interest pursuant to Public Contract Code section 20104.50. If the Owner accepts an Application as a proper payment request, the Owner may still withhold payment as allowed by Section 9.5.1 below.

9.4.2 Owner's Review

The review of the Contractor's Application for Payment by the Owner will be based, at least in part, on the Owner's observations at the Site and the data comprising the Application for Payment that the Work has progressed to the point indicated. The review is also subject to an evaluation of the Work for conformance with the Contract Documents, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to Completion, and to specific qualifications expressed by the Owner. The Owner may reject the Application for Payment if the Application is not complete under Section 9.3, including all supporting documents required by Section 9.3. The issuance of a Certificate for Payment will constitute a representation that the Contractor is entitled to payment in the amount certified, subject to any withholdings under Section 9.5.1 or any specific qualifications Owner expresses in the Certificate for Payment. However, Contractor's entitlement to payment may be affected by subsequent evaluations of the Work for conformance with the Contract Documents, test and inspections and discovery of minor deviations from the Contract Documents correctable prior to Completion. The issuance of a Certificate for Payment will not be a waiver by the Owner of any defects in the Work covered by the Application for Payment, nor will it be a representation that the Owner has:

A. Made exhaustive or continuous on-Site inspections to check the quality or quantity of the Work;

B. Reviewed construction means, methods, techniques, sequences, or procedures;

C. Reviewed copies of requisitions received from Subcontractors, material and equipment suppliers, and other data requested by the Owner to substantiate the Contractor's right to payment; or

D. Made an examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

9.5 DECISIONS TO WITHHOLD PAYMENT

9.5.1 Reasons to Withhold Payment

The Owner may withhold from a progress payment, in whole or in part, to such extent as may be necessary to protect the Owner due to any of the following:

A. Defective or incomplete Work not yet remedied, including but not limited to Punch List corrective work pursuant to Section 9.7.1 below and warranty corrective work pursuant to Section 12.2.5 below;

B. Stop Payment Notices. For any stop payment notice, the Owner shall withhold the amount stated in the stop payment notice, the stop notice claimant's anticipated interest and court costs and an amount to provide for the Owner's reasonable cost of any litigation pursuant to the stop payment notice. For any stop payment notice action the parties resolve before judgment is entered, Owner has the right to permanently withhold for any reasonable cost of litigation for that stop payment notice, even if it exceeds the amount originally withheld by Owner for the estimated reasonable cost of litigation. However, if (1) the Contractor at its sole expense provides a bond or other security satisfactory to the Owner in the amount of at least one hundred twenty-five percent (125%) of the claim, in a form satisfactory to the Owner, which protects the Owner against such claim, and (2) the Owner chooses to accept the bond, then Owner would release the withheld stop payment notice funds to the Contractor, except that Owner may permanently withhold for any reasonable cost of litigation. Any stop payment notice release bond shall be executed by a California admitted, fiscally solvent surety, completely unaffiliated with and separate from the surety on the payment and performance bonds, that does not have any assets pooled with the payment and performance bond sureties.

C. Liquidated damages against the Contractor, whether already accrued or estimated to accrue in the future;

D. Reasonable doubt that the Work can be Completed for the unpaid balance of any Contract Sum or within the Contract Time;

E. Damage to the property or work of the Owner, another contractor, or subcontractor;

F. Unsatisfactory prosecution of the Work by the Contractor;

G. Failure to store and properly secure materials;

H. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, monthly progress schedules, shop drawings, submittal schedules, schedule of values, product data and samples, proposed product lists, executed change orders, and verified reports;

I. Failure of the Contractor to maintain record drawings;

J. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment;

K. Unauthorized deviations from the Contract Documents;

L. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and Completion deadlines;

M. Subsequently discovered evidence or observations nullifying the whole or part of a previously issued Certificate for Payment;

N. Failure by Contractor to pay Subcontractors or material suppliers as required by Contract or law, which includes but is not limited to Contractor's failure to pay prevailing wage and any assessment of statutory penalties;

O. Overpayment to Contractor on a previous payment;

P. Credits owed to Owner for reduced scope of work or work that Contractor will not perform, including credits for any unspent allowance;

Q. The estimated cost of performing work pursuant to Section 2.4;

R. Actual damages related to false claims by Contractor;

S. Breach of any provision of the Contract Documents;

T. Owner's potential or actual loss, liability or damages caused by the Contractor, including defense costs and attorneys' fees incurred due to Contractor's failure to defend an action pursuant to the indemnity provisions in the Contract Documents; and

U. As permitted by other provisions in the Contract or as otherwise allowed by law, including statutory penalties Owner or other entities assessed against Contractor. (See e.g., Labor Code section 1813 (working hours) or Public Contract Code

section 4110 (subcontractor listings and substitutions))

Owner may, but is not required to, provide to Contractor written notice of the items for which Owner is withholding amounts from a progress payment.

If Contractor claims a breach of contract or violation of law based on wrongful withholding by the Owner from a progress payment or based on a late progress payment, or if Contractor otherwise disputes any progress payment or lack thereof, then within fifteen (15) days of the alleged breach of contract, violation of law, or late or disputed progress payment Contractor shall submit a Claim pursuant and subject to Sections 4.5.3-4.5.6. The Contractor need not submit a Notice of Potential Change or a Change Order Request.

For any withhold amount based on an estimate where the actual amount later becomes known and certain, no later than the final accounting for the Contract the Owner will release any amount withheld over that certain and known amount. If the certain and known amount exceeds the amount previously withheld, Owner may withhold additional amounts from Contractor to cover the excess amount. If available funds are not sufficient, Contractor shall pay Owner the difference.

Despite any withholding from a progress payment, or any other dispute about a progress payment, Contractor shall continue to expeditiously perform the Work pursuant to the Contract Documents, including but not limited to General Conditions sections 4.5.7, 7.1.1, 8.3.1, and 8.3.3.

9.5.2 Payment After Cure

When Contractor removes or cures the grounds for withholding amounts, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

9.5.3 Overpayment and/or Failure to Withhold

Neither Owner's overpayment to Contractor, nor Owner's failure to withhold an amount from payment that Owner had the right to withhold, shall constitute a waiver by Owner of its rights to withhold those amounts from future payments to Contractor or to otherwise pursue recovery of those amounts from Contractor.

9.6 PROGRESS PAYMENTS

9.6.1 Payments to Contractor

Progress payments shall be made in accordance with Public Contract Code sections 7201, 9203, and 20104.50. Unless otherwise stated in the Contract Documents, within thirty (30) days

after receipt of an undisputed and properly submitted Application for Payment ("properly submitted" means in compliance with the law and the Contract Documents, including submittal of all documents required to accompany the Application [see Section 9.3.1, above]), Contractor shall be paid a sum equal to ninety-five percent (95%) of the undisputed value of the Work performed up to the last day of the previous month, less the aggregate of previous payments; and Owner shall withhold the other five percent (5%) of the undisputed value of the Work as retainage (or "retention"). The value of the Work completed shall be an estimate only, no inaccuracy or error in said estimate shall operate to release the Contractor, or any bondsman, from damages arising from such Work or from enforcing each and every provision of this Contract, and the Owner shall have the right subsequently to correct any error made in any estimate for payment. Contractor shall base an Application for Payment only on the original Contract Sum plus any fully executed and Board-approved Change Orders. Contractor shall not include Notices of Potential Claims, CORs, Claims or disputed amounts.

The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for work performed, so long as any lawful or proper direction given by the Owner concerning the Work, or any portion thereof, remains uncomplied with. Payment shall not be a waiver of any such direction.

9.6.2 Payments to Subcontractors

No later than ten (10) days after receipt of payment from Owner, pursuant to Business and Professions Code section 7108.5, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

9.6.3 Percentage of Completion or Payment Information

The Owner will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of Completion or amounts applied for by the Contractor, and action taken thereon by the Owner, on account of portions of the Work done by such Subcontractor.

9.6.4 No Obligation of Owner for Subcontractor Payment

The Owner shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to Suppliers

Payment to material or equipment suppliers shall be treated in a manner similar to that provided in paragraphs 9.6.2, 9.6.3 and 9.6.4.

9.6.6 Payment Not Constituting Approval or Acceptance

An accepted Application for Payment, issuance of a Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance or approval of any portion of the Work, especially any Work not in accordance with the Contract Documents.

9.6.7 Joint Checks

Owner shall have the right, if necessary for the protection of the Owner, to issue joint checks made payable to the Contractor and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. However, Owner has no duty to issue joint checks. In no event shall any joint check payment be construed to create any contract between the Owner and a Subcontractor of any tier, any obligation from the Owner to such Subcontractor, or rights in such Subcontractor against the Owner.

9.7 COMPLETION OF THE WORK

9.7.1 Close-Out Procedures

When the Contractor considers that the Work is Complete and submits a written notice to Owner requesting an inspection of the Work, the Owner shall review the Work and prepare and submit to the Contractor one or more comprehensive lists of items to be Completed or corrected (the "Punch List"). The Punch List shall include all outstanding obligations of Contractor, including training, start-up, testing, and submission to Owner of all required documentation (e.g., written guarantees, warranties, invoices, as-built drawings, manuals, bonds, and the documents described in Sections 9.3 and 9.9). The Contractor and/or its Subcontractors shall proceed promptly to Complete and correct items on the Punch List. Failure to include an item on the Punch List does not alter the responsibility of the Contractor to Complete all Work (including the omitted item) in accordance with the Contract Documents, and to Complete or correct the Work so long as the statute of limitations (or repose) has not run.

When the Contractor believes the Punch List Work is Complete and in accordance with the Contract Documents, it shall then submit a request for an additional inspection by the Owner to determine Completion. Owner shall again inspect the Work and inform the Contractor of any items that are not complete or correct. Contractor shall promptly Complete or correct items until no items remain.

After the Work, including all Punch List Work, is inspected and informally deemed by the Owner to be Complete, the Owner's governing body may formally accept the Work as Complete at a meeting of the governing body. Warranties required by the Contract Documents shall commence on the date of Contractor's Completion of the Work (see Sections 3.5, 12.2.5, and 12.2.6).

Owner may record a Notice of Completion as allowed by Civil Code section 9200 *et seq*.

9.7.2 COSTS OF MULTIPLE INSPECTIONS

More than two (2) requests by Contractor to make inspections to confirm Completion as required under paragraph 9.7.1 shall be considered an additional service of Owner, and all subsequent costs will be invoiced to Contractor and withheld from remaining payments.

9.8 PARTIAL OCCUPANCY OR USE

The Owner may occupy or use any completed, or partially completed, portion of the Work at any stage prior to acceptance, or prior to Completion if there is no formal acceptance. Occupancy or use of any portion of the Work, or the whole Work, shall not constitute approval or acceptance of it, nor shall such occupancy or use relieve Contractor of any of its obligations under the Contract Documents regarding that portion of, or the whole, Work.

For such partial occupancy, the Owner and the Contractor shall agree in writing to the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, and the period for correction of the Work under the Contract Documents. If the Owner and Contractor cannot reach agreement in writing, then the Owner may take partial occupancy and direct Contractor to perform Work as the Owner deems necessary; and if the Contractor believes that any of the directed Work requires additional compensation or time, then Contractor may seek an adjustment of compensation or time pursuant to Section 4.5, above.

When the Contractor considers a portion complete, the Contractor may request an inspection of that portion and preparation of a Punch List by the Owner for that portion, as set forth for the entire Work under paragraph 9.7.1; however, such inspection and Punch List shall not act as any form of approval or acceptance of that portion of the Work, or of any Work not complying with the requirements of the Contract, and that portion shall be subject to subsequent inspections and Punch Lists.

Immediately prior to such partial occupancy or use, the Owner, the Architect and the Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.9 FINAL PROGRESS PAYMENT AND RELEASE OF RETENTION

9.9.1 Final Application for Progress Payment

When, pursuant to Section 9.7.1, the Owner finds all of the Work is Completed in accordance with the Contract Documents, it shall so notify Contractor, who shall then submit to the Owner its final Application for Payment.

Upon receipt and approval of such final Application for Payment, the Owner shall issue a final Certificate of Payment, based on its knowledge, information, and belief, and on the basis of its observations, inspections, and all other data accumulated or received by the Owner in connection with the Work, that such Work has been Completed in accordance with the Contract Documents. If required to do so under Labor Code section 1773.3(d), Owner shall withhold final payment.

9.9.2 Procedures for Application for Final Progress Payment

The Application for Final Progress Payment pursuant to Section 9.9.1 shall be accompanied by the same details as set forth in Section 9.3, and in addition, the following conditions must be fulfilled:

A. The Work shall be Complete, and the Contractor shall have made, or caused to have been made, all corrections to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of Owner required under the Contract.

B. Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work, and Contractor delivered them to the Owner.

C. The Contractor shall deliver to the Owner (i) reproducible final Record Drawings and Annotated Specifications showing the Contractor's Work "as built," with the Contractor's certification of the accuracy of the Record Drawings and Annotated Specifications, (ii) all warranties and guarantees, (iii) operation and maintenance instructions, manuals and materials for equipment and apparatus, and (iv) all other documents required by the Contract Documents.

D. Contractor shall provide extensive assistance in the utilization of any equipment or system such as initial start-up or testing, adjusting and balancing, preparation of operation and maintenance manuals and training personnel for operation and maintenance.

Acceptance of Final Progress Payment shall constitute a complete waiver of Claims except for

those previously identified in writing and identified by that payee as unsettled at the time of Final Progress Payment.

9.9.3 Release of Retainage

Owner shall withhold not less than 5% of the Contract Sum ("retainage," or "retention") until Completion and acceptance of the Project, per Public Contract Code section 9203.

Owner may withhold from release or payment of retainage up to 150% of disputed amounts, including but not limited to the issues listed in Section 9.5. If retainage is held in an escrow account pursuant to an escrow agreement under Public Contract Code section 22300 (see Section 9.10) and Owner withholds from release of retainage based on a breach of the Contract, or other default, by Contractor, Owner may withdraw the withheld retainage from the escrow account.

Owner shall release the undisputed retainage within sixty (60) days after Completion of the Project. For this purpose, "Completion" is defined in Public Contract Code section 7107(c). No interest shall be paid on any retainage, or on any amounts withheld, except as provided to the contrary in any Escrow Agreement and General Conditions between the Owner and the Contractor under Public Contract Code section 22300.

To claim a breach of contract or violation of law based on wrongful withholding by the Owner from retention or based on a late payment or late release of retention, or if Contractor otherwise disputes any payment or release of retention or lack thereof, within fifteen (15) days of the alleged breach of contract, violation of law, or late or disputed payment/release of retention Contractor shall submit a Claim pursuant and subject to Sections 4.5.3-4.5.6. The Contractor need not submit a Notice of Potential Change or a Change Order Request.

9.10 SUBSTITUTION OF SECURITIES

In accordance with section 22300 of the Public Contract Code, the Owner will permit the substitution of securities for any retention monies withheld by the Owner to ensure performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the Owner, or with a state or federally chartered bank as the escrow agent, who shall then pay such retention monies to the Contractor. Upon Completion of the Contract, the securities shall be returned to the Contractor if Owner has no basis to withhold under the Contract Documents.

Securities eligible for investment under this section shall include those listed in Government Code section 16430, bank or savings and loan certificates of deposit, interest-bearing, demand-deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Owner.

The Contractor shall be the beneficial owner of any securities substituted for monies withheld

and shall receive any interest thereon.

Any escrow agreement entered by Owner and Contractor pursuant to Public Contract Code section 22300, shall be substantially similar to the form set forth in Public Contract Code section 22300.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 Contractor Responsibility

The Contractor shall have responsibility for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. Each Contractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs. Contractor will ensure that his employees and Subcontractors cooperate and coordinate safety matters with any other contractors on the Project to form a joint safety effort.

10.1.2 Subcontractor Responsibility

Subcontractors have the responsibility for participating in, and enforcing, the safety and loss prevention programs established by the Contractor for the Project, which will cover all Work performed by the Contractor and its Subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

10.1.3 Cooperation

All Subcontractors and material or equipment suppliers, shall cooperate fully with Contractor, the Owner, and all insurance carriers and loss prevention engineers.

10.1.4 Accident Reports

Subcontractors shall promptly report in writing to the Contractor all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident

shall be reported immediately by telephone or messenger. Contractor shall thereafter promptly report the facts in writing to the Owner giving full details of the accident.

10.1.5 First-Aid Supplies at Site

The Contractor will provide and maintain at the Site first-aid supplies for minor injuries.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor

The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

A. Employees on the Work and other persons who may be affected thereby;

B. The Work, material, equipment, tools, construction equipment, and machinery to be incorporated therein or necessary for the proper execution and Completion of the Work, whether in storage on or off the Site, under the care, custody, or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

C. Other property at the Site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

10.2.2 Contractor Notices

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss.

10.2.3 Safety Barriers and Safeguards

The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

10.2.4 Use or Storage of Hazardous Material

When use or storage of explosives, other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall notify the Owner any time that explosives or hazardous materials are expected to be stored on

Site. Location of storage shall be coordinated with the Owner and local fire authorities.

10.2.5 Fingerprinting

At its own expense, Contractor shall comply with all fingerprinting requirements under law and Contract, including but not limited to the requirements of Education Code section 45125.2 and the Independent Contractor Student Contact Form which is a part of the Contract. Contractor shall hold harmless, defend and indemnify the Owner under section 3.16, for any costs, including attorneys' fees, Owner incurs from Contractor's failure to comply.

10.3 PROTECTION OF WORK AND PROPERTY

10.3.1 Protection of Work

The Contractor and Subcontractors shall continuously protect the Work, the Owner's property, and the property of others, from damage, injury, or loss until the earlier of formal acceptance of the Work or Completion of the Work. The Contractor and Subcontractors shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of the Owner; except that for projects not solely funded through revenue bonds, (a) Contractor shall not be responsible for damages caused by a tidal wave to the extent that the damages exceed 5% of the Contract Sum, and (b) Contractor shall not be responsible for damages caused by an earthquake above 3.5 on the Richter Scale in magnitude to the extent that the damages exceed 5% of the Contract Sum, per Public Contract Code §7105(a).

10.3.2 Protection for Elements

The Contractor will remove all mud, water, or other elements as may be required for the proper protection and prosecution of its Work. The Contractor shall at all times provide labor, services, equipment, materials, heat, coverings, enclosures, and other services and materials necessary to maintain adequate protection against weather (including unusual or uncommon weather) so as to preserve the Work, materials, equipment, apparatus, and fixtures free from injury or damage.

10.3.3 Shoring and Structural Loading

The Contractor shall not impose structural loading upon any part of the Work under construction or upon existing construction on or adjacent to the Site in excess of safe limits, or loading such as to result in damage to the structural, architectural, mechanical, electrical, or other components of the Work. The design of all temporary construction equipment and appliances used in construction of the Work and not a permanent part thereof, including, without limitation, hoisting equipment, cribbing, shoring, and temporary bracing of structural steel, is the sole responsibility of the Contractor. All such items shall conform to the requirements of governing

codes and all laws, ordinances, rules, regulations, and orders of all authorities having jurisdiction. The Contractor shall take special precautions, such as shoring of masonry walls and temporary tie bracing of structural steel work, to prevent possible wind damage during construction of the Work. The installation of such bracing or shoring shall not damage or cause damage to the Work in place or the Work installed by others. Any damage which does occur shall be promptly repaired by the Contractor at no cost to the Owner.

10.3.4 Conformance Within Established Limits

The Contractor and Subcontractors shall confine their construction equipment, the storage of materials, and the operations of workers to the limits indicated by laws, ordinances, permits, and the limits established by the Owner, and shall not unreasonably encumber the premises with construction equipment or materials.

10.3.5 Subcontractor Enforcement of Rules

Subcontractors shall enforce the Owner's and the Contractor's instructions, laws, and regulations regarding signs, advertisements, fires, smoking, the presence of liquor, and the presence of firearms by any person at the Site.

10.3.6 Site Access

The Contractor and the Subcontractors shall use only those ingress and egress routes designated by the Owner, observe the boundaries of the Site designated by the Owner, park only in those areas designated by the Owner, which areas may be on or off the Site, and comply with any parking control program established by the Owner such as furnishing license plate information and placing identifying stickers on vehicles.

10.3.7 Protection of Materials

The Contractor and the Subcontractors shall receive, count, inspect for damage, record, store, and protect construction materials for the Work and Subcontractors shall promptly send to the Contractor evidence of receipt of such materials, indicating thereon any shortage, change, or damage (failure to so note shall constitute acceptance by the Subcontractor of financial responsibility for any shortage).

10.4 EMERGENCIES

10.4.1 Emergency Action

In an emergency affecting the safety of persons or property, the Contractor shall take any action necessary, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional money or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.5 and Article 7.

10.4.2 Accident Reports

The Contractor shall promptly report in writing to the Owner all accidents arising out of or in connection with the Work, which caused death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner.

10.5 HAZARDOUS MATERIALS

10.5.1 Discovery of Hazardous Materials

In the event the Contractor encounters or suspects the presence on the Site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or any other material defined as being hazardous by section 25249.5 of the California Health and Safety Code, which (a) has not been rendered harmless, and (b) the handling or removal of which is not within the scope of the Work, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing, whether such material was generated by the Contractor, another contractor, or the Owner. The Work in the affected area shall not thereafter be resumed, except by written agreement of the Owner and the Contractor, if in fact the material is asbestos, polychlorinated biphenyl (PCB), or other hazardous material, and has not been rendered harmless. The Work in the affected area shall be resumed only in the absence of asbestos, polychlorinated biphenyl (PCB), or other hazardous material, or when it has been rendered harmless by written agreement of the Owner and the Contractor.

10.5.2 Hazardous Material Work Limitations

In the event that the presence of hazardous materials is suspected or discovered on the Site, the Owner shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. The Contractor shall not be required pursuant to Article 7 to perform without consent any Work in the affected area of the Site relating to asbestos, polychlorinated biphenyl (PCB), or other hazardous material, until any known or suspected hazardous material has been removed, or rendered harmless, or determined to be harmless by Owner, as certified by an independent testing laboratory and/or approved by the appropriate government agency.

10.5.3 Indemnification By Owner for Hazardous Material Not Caused by Contractor

In the event the presence of hazardous materials on the Site is not caused by the Contractor, Owner shall pay for all costs of testing and remediation, if any, and shall compensate Contractor for any delay or additional costs incurred in accordance with the applicable provisions of Articles 7 and 8 herein. Owner shall defend, indemnify and hold harmless the Contractor and its agents, officers, directors and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with or arising out of, or relating to, the performance of the Work in the area affected by the hazardous material, except to the extent the claims, damages, losses, costs, or expenses were caused by Contractor's active negligence, sole negligence or willful misconduct. By providing this indemnification, Owner does not waive any immunities.

10.5.4 Naturally Occurring Asbestos

If the Site is found to contain naturally occurring asbestos (asbestos naturally contained in rocks which can become airborne when released "NOA"), in addition to complying with applicable provisions in sections 10.5.1-10.5.3 above, Contractor shall comply with, and be solely responsible for, all applicable NOA requirements of the California Air Resources Board (CARB), California Department of Industrial Relations, California Division of Occupational Safety and Health (Cal/OSHA), any local air quality management district with jurisdiction over the Site, the County, and all other applicable federal, State and local governmental entities. This compliance and responsibility includes, but is not limited to, dust control mitigation measures and a monitoring plan.

10.5.5 Indemnification by Contractor for Hazardous Material Caused by Contractor

In the event the presence of hazardous materials on the Site is caused by Contractor, Subcontractors, materialmen or suppliers, the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the Owner for any additional costs incurred as a result of the generation of hazardous material on the Project Site. In addition, the Contractor shall defend, indemnify and hold harmless Owner and its agents, officers, and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with, arising out of, or relating to, the presence of hazardous material on the Site, except to the extent

the claims, damages, losses, costs, or expenses were caused by Owner's active negligence, sole negligence or willful misconduct.

10.5.6 Terms of Hazardous Material Provision

The terms of this Hazardous Material provision shall survive the Completion of the Work and/or any termination of this Contract.

10.5.7 Archeological Materials

In the event the Contractor encounters or reasonably suspects the presence on the Site of archeological materials, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing. The Work in the affected area shall not thereafter be resumed, except after Contractor's receipt of written notice from the Owner.

ARTICLE 11

INSURANCE AND BONDS

11.1. CONTRACTOR'S LIABILITY INSURANCE

11.1.1 Liability Insurance Requirements

11.1.1 By the earlier of the deadline set forth in the Instructions to Bidders or the commencement of the Work and within limits acceptable to the Owner, the Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports such commercial general liability insurance per occurrence for bodily injury, personal injury and property damage as set forth in the Agreement and automobile liability insurance per accident for bodily injury and property damage combined single limit as set forth in the Agreement as will protect the Contractor from claims set forth below, which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations are by the Contractor, by a Subcontractor, by Sub-subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

11.1.1.1 claims for damages because of bodily injury (including emotional distress), sickness, disease, or death of any person other than the Contractor's employees. This coverage shall be provided in a form at least as broad as Insurance Services Office (ISO) Form CG 0001 11188;

11.1.1.2 claims for damages arising from personal or advertising injury in a form at least as broad as ISO Form CG 0001 11188;

11.1.1.3 claims for damages because of injury or destruction of tangible property, including loss of use resulting therefrom, arising from operations under the Contract Documents; and

11.1.1.4 claims for damages because of bodily injury, death of a person, or property damage arising out of the ownership, maintenance, or use of a motor vehicle, all mobile equipment, and vehicles moving under their own power and engaged in the Work; and

11.1.1.5 claims involving blanket contractual liability applicable to the Contractor's obligations under the Contract Documents, including liability assumed by and the indemnity and defense obligations of the Contractor and the Subcontractors; and

11.1.1.6 claims involving Completed Operations, Independent Contractors' coverage, and Broad Form property damage, without any exclusions for collapse, explosion, demolition, underground coverage, and excavating. (XCU)

If commercial general liability insurance or another insurance form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the project location (with the ISO CG 2501 or insurer's equivalent endorsement provided to the Owner) or the general aggregate limit shall be twice the required occurrence limit.

Any deductible or self-insured retention must be declared to and approved by the Owner. At the option of the Owner, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its Board of Trustees, members of its Board of Trustees, officers, employees, agents and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

11.1.2 **Subcontractor Insurance Requirements**

The Contractor shall require its Subcontractors and any Sub-subcontractors to take out and maintain similar public liability insurance and property damage insurance, in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports, in like amounts and scope of coverage.

11.1.3 **Owner's Insurance**

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability

insurance. Optionally, the Owner may purchase and maintain other insurance for self protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

11.1.4 Additional Insured Endorsement Requirements

The Contractor shall name, on any policy of insurance (except worker's compensation or professional liability policies), the Owner (including its authorized representatives; see Section 2.1, above) as additional insureds. Subcontractors shall name the Contractor and the Owner as additional insureds. The Additional Insured Endorsement included on all such insurance policies shall state that coverage is afforded the additional insured with respect to claims arising out of operations performed by or on behalf of the insured. If the additional insureds have other insurance which is applicable to the loss, such other insurance shall be excess to any policy of insurance required herein. The amount of the insurer's liability shall not be reduced by the existence of such other insurance.

11.1.5 Workers' Compensation Insurance

During the term of this Contract, the Contractor shall provide workers' compensation insurance for all of the Contractor's employees engaged in Work under this Contract on or at the Site of the Project and, in case any of the Contractor's work is sublet, the Contractor shall require the Subcontractor to provide workers' compensation insurance for all the Subcontractor's employees engaged in Work under the subcontract. Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in Work under this Contract on or at the Site of the Project is not protected under the Workers' Compensation laws, the Contractor shall provide or cause a Subcontractor to provide adequate insurance coverage for the protection of those employees not otherwise protected. The Contractor shall file with the Owner certificates of insurance as required under this Article and in compliance with Labor Code section 3700.

If the contractor fails to maintain such insurance, the Owner may take out compensation insurance which the Owner might be liable to pay under the provisions of the Act by reason of an employee of the Contractor being injured or killed, and withhold from progress payments and/or retention the amount of the premium for such insurance.

11.1.6 Builder's Risk/"All Risk" Insurance

11.1.6.1 Course-of-Construction Insurance Requirements

Unless provided by Owner at Owner's sole discretion, Contractor, during the progress of the Work and until final acceptance of the Work by Owner upon Completion of the entire Contract, shall maintain Builder's Risk/Course-of-Construction insurance satisfactory to the Owner, issued on a completed value basis on all insurable Work included under the Contract Documents. This

insurance shall insure against all risks, including but not limited to the following perils: Vandalism, theft, malicious mischief, fire, sprinkler leakage, civil authority, sonic boom, explosion, collapse, flood including tidal wave (however, for projects not solely funded through revenue bonds, Contractor is only required to provide insurance for damages caused by a tidal wave up to 5% of the Contract Sum [except as provided in Section 11.1.6.2, below; see Public Contract Code §7105(a)]), earthquake (however, for projects not solely funded through revenue bonds, Contractor is only required to provide insurance for damages caused by a large earthquake [i.e., one above 3.5 magnitude on the Richter Scale] up to 5% of the Contract Sum [except as provided in Section 11.1.6.3, below; see Public Contract Code §7105(a)]), wind, hail, lightning, smoke, riot or civil commotion, debris removal (including demolition) and reasonable compensation for the Architect's services and expenses required as a result of such insured loss. This insurance shall provide coverage in an amount not less than the full cost to repair, replace or reconstruct the Work. Such insurance shall include the Owner, the Architect, and any other person or entity with an insurable interest in the Work as an additional named insured.

The Contractor shall submit to the Owner for its approval all items deemed to be uninsurable under the Builder's Risk/Course-of Construction insurance. The risk of the damage to the Work due to the perils covered by the Builder's Risk/Course-of-Construction insurance, as well as any other hazard which might result in damage to the Work, is that of the Contractor and the surety, and no claims for such loss or damage shall be recognized by the Owner, nor will such loss or damage excuse the Complete and satisfactory performance of the Contract by the Contractor.

11.1.6.2 TIDAL WAVE INSURANCE

If the Contract is not solely funded through revenue bonds and Owner accepts and awards an alternate bid by Contractor for insurance coverage for a tidal wave, Contractor shall maintain, in effect during the Work and until final acceptance of the Work by Owner upon Completion of the entire Contract, insurance providing coverage for loss, destruction or damage arising out of or caused by tidal wave and other similar acts of God. This insurance shall provide coverage in an amount not less than the full cost to repair, replace or reconstruct the Work.

11.1.6.3 EARTHQUAKE INSURANCE

If the Contract is not solely funded through revenue bonds and Owner accepts and awards an alternate bid by Contractor for insurance coverage for an earthquake over 3.5 on the Richter Scale, Contractor shall maintain, in effect during the Work and until final acceptance of the Work by Owner upon Completion of the entire Contract, insurance providing coverage for loss, destruction or damage arising out of or caused by earthquake and/or other earth movement, whether seismic or volcanic in origin, over 3.5 on the Richter Scale in magnitude. This insurance shall provide coverage in an amount not less than the full cost to repair, replace or reconstruct the Work**.**

11.1.7 **Consent of Insurer for Partial Occupancy or Use**

Partial occupancy or use in accordance with the Contract Documents shall not commence until the insurance company providing property insurance has consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company and shall, without mutual consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of the insurance.

11.1.8 **Fire Insurance**

Before the commencement of the Work, the Contractor shall procure, maintain, and cause to be maintained at the Contractor's expense, fire insurance on all Work included under the Contract Documents, insuring the full replacement value of such Work as well as the cost of any removal and demolition necessary to replace or repair all Work damaged by fire. The amount of fire insurance shall be subject to approval by the Owner and shall be sufficient to protect the Work against loss or damage in full until the Work is accepted by the Owner. Should the Work being constructed be damaged by fire or other causes during construction, it shall be replaced in accordance with the requirements of the drawings and specifications without additional expense to the Owner.

11.1.9 **Other Insurance**

The Contractor shall provide all other insurance required to be maintained under applicable laws, ordinances, rules, and regulations.

11.1.10 **Proof of Carriage of Insurance**

The Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract until all required insurance, certificates, and an Additional Insured

Endorsement and Declarations Page have been obtained and delivered in duplicate to the Owner for approval subject to the following requirements:

(a) Certificates and insurance policies shall include the following clause:

> This policy shall not be non-renewed, canceled, or reduced in required limits of liability or amounts of insurance until notice has been mailed to the Owner. Date of cancellation or reduction may not be less than thirty (30) days after the date of mailing notice.

(b) Certificates of insurance shall state in particular those insured, the extent of insurance, location and operation to which the insurance applies, the expiration date, and cancellation and reduction notices.

(c) Certificates of insurance shall clearly state that the Owner and the Architect are named as additional insureds under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by Owner and any other insurance carried by the Owner with respect to the matters covered by such policy shall be excess and non-contributing.

(d) The Contractor and its Subcontractors shall produce a certified copy of any insurance policy required under this Section upon written request of the Owner.

11.1.11 **Compliance**

In the event of the failure of any contractor to furnish and maintain any insurance required by this Article, the Contractor shall be in default under the Contract. Compliance by Contractor with the requirement to carry insurance and furnish certificates, policies, Additional Insured Endorsement and Declarations Page evidencing the same shall not relieve the Contractor from liability assumed under any provision of the Contract Documents, including, without limitation, the obligation to defend and indemnify the Owner and the Architect.

11.2 PERFORMANCE AND PAYMENT BONDS

11.2.1 **Bond Requirements**

Unless otherwise specified in the Contract Documents, prior to commencing any portion of the Work, the Contractor shall apply for and furnish Owner separate payment and performance bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate surety authorized and admitted to transact business in California. All bonds shall

be submitted on the Owner's approved form.

To the extent, if any, that the Contract Sum is increased in accordance with the Contract Documents, the Contractor shall cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the Owner. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Sum, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the surety. If the Contractor fails to furnish the required bond, the Owner may terminate the Contract for cause.

11.2.2 Surety Qualification

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure section 995.120 shall be accepted. The surety insurers must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bonds, have a rating not lower than "A-" as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurers selected by Contractor and to require Contractor to obtain bonds from surety insurers satisfactory to the Owner.

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

12.1.1 Uncovering Work for Required Inspections

If a portion of the Work is covered contrary to the Owner's request or to requirements specifically expressed in the Contract Documents, Contractor must, if required in writing by the Owner, uncover it for the Owner's observation and replace the removed work at the Contractor's expense without change in the Contract Sum or Time.

12.1.2 Costs for Inspections not Required

If a portion of the Work has been covered which the Owner has not specifically requested to observe prior to its being covered, the Owner may request to see such work, and it shall be uncovered by the Contractor. If such work is in accordance with the Contract Documents, costs of uncover and replacement shall, by appropriate Change Order, be paid by the Owner. If such work is not in accordance with Contract Documents, the Contractor shall pay such costs, unless the condition was caused by the Owner or a separate contractor, in which event the Owner shall be responsible for payment of such costs to the Contractor.

12.2 CORRECTION OF WORK; WARRANTY

12.2.1 Correction of Rejected Work

The Contractor shall promptly correct Work rejected by the Owner prior to Completion for failure to conform to the requirements of the Contract Documents. The Contractor shall bear costs of correcting the rejected work, including additional testing, inspections, and compensation for the Owner's expenses and costs incurred.

12.2.2 Removal of Nonconforming Work

The Contractor shall remove from the Site portions of the Work which are not in accordance with the requirements of the Contract Documents and are not corrected by the Contractor or accepted or approved by the Owner.

12.2.3 Owner's Rights if Contractor Fails to Correct

If the Contractor fails to correct nonconforming work within a reasonable time, the Owner may correct it in accordance with Section 2.4. As part of Owner's correction of the work, the Owner may remove any portion of the nonconforming Work and store any salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten (10) days after written notice, the Owner may upon ten (10) additional days written notice sell such material or equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's and other professionals and representatives' services and expenses, made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contractor shall be invoiced for the deficiency or Owner may withhold such costs from payment pursuant to Section 9.5. If progress payments or retention then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

12.2.4 Cost of Correcting the Work

The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or separate contractors, whether completed or partially completed, caused by the Contractor's correction or removal of the nonconforming work.

12.2.5 Warranty Corrections (includes replacement)

Pursuant to the warranty in Sections 3.5 and 9.7.1, if within one (1) year after the Completion of the Work (or within a longer time period for an applicable special warranty or guarantee required by the Contract Documents) any of the Work does not comply with the Contract Documents, the Contractor shall correct it after receipt of Owner's written notice to do so. Contractor shall correct the Work promptly, and passage of the applicable warranty period shall not release

Contractor from its obligation to correct the Work if Owner provided the written notice within the applicable warranty period. Contractor's obligation to correct the warranty item continues until the correction is made. After the correction is made to Owner's satisfaction, a new warranty period of the same length as the original warranty period shall run on the corrected work. The obligations under this paragraph 12.2.5 shall survive acceptance of the Work under the Contract and termination of the Contract.

12.2.6 **No Time Limitation**

Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one (1) year as described in Sections 3.5, 9.7.1, and 12.2.5 relates only to the specific warranty obligation of the Contractor to correct the Work after the date of commencement of warranties, and has, for example, no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, or to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations under the Contract Documents (including but not limited to a patent or latent deficiency).

12.3 NONCONFORMING WORK AND WITHHOLDING THE VALUE OF IT

If it is found at any time before Completion of the Work that the Contractor has varied from the Contract Documents in materials, quality, form, finish, or in the amount or value of the materials or labor used, the Owner may, in addition to other remedies in the Contract Documents or under law and as allowed by law, accept the improper Work. The Owner may withhold from any amount due or to become due Contractor that sum of money equivalent to the difference in value between the Work performed and that called for by the Drawings and Specifications. The Owner shall determine such difference in value. No structural-related Work shall be accepted that is not in conformance with the Contract Documents.

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

The Owner and the Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the

Contract as a whole or in part without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3 WRITTEN NOTICE

In the absence of specific notice requirements in the Contract Documents, any written notice required by the Contract Documents shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified or overnight mail to the last business address known to the party giving notice. Owner shall, at Contractor's cost, timely notify Contractor of Owner's receipt of any third party claims relating to the Contract pursuant to Public Contract Code section 9201.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and Obligations Cumulative

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

13.4.2 No Waiver

No action or failure to act by the Owner, Inspector of Record, Architect or any construction manager shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed to in a written amendment to the Contract.

13.5 TESTS AND INSPECTIONS

13.5.1 Compliance

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

13.5.2 Independent Testing Laboratory

The Owner will select and pay an independent testing laboratory to conduct all tests and inspections, including shipping or transportation costs or expenses (mileage and hours). Selection of the materials required to be tested shall be made by the laboratory and not by the Contractor. However, if Contractor requests that the Owner use a different testing laboratory

and Owner chooses to approve such request, Contractor shall reimburse the Owner for any additional shipping or transportation costs or expenses (mileage and hours). Owner may invoice such costs or expenses to the Contractor or withhold such costs or expenses from progress payments and/or retention.

13.5.3 Advance Notice to Inspector of Record

The Contractor shall notify the Inspector of Record a sufficient time in advance of its readiness for required observation or inspection so that the Inspector of Record may arrange for same. The Contractor shall notify the Inspector of Record a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector of Record may arrange for the testing of the material at the source of supply.

13.5.4 Testing Off-Site

Any material shipped by the Contractor from the source of supply, prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said Inspector of Record that such testing and inspection will not be required, shall not be incorporated in the Work.

13.5.5 Additional Testing or Inspection

If the Inspector of Record, the Architect, the Owner, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under section 13.5.1, the Inspector of Record will, upon written authorization from the Owner, make arrangements for such additional testing, inspection, or approval. The Owner shall bear such costs except as provided in section 13.5.6.

13.5.6 Costs for Retesting

If such procedures for testing, inspection, or approval under sections 13.5.1, 13.5.2 and 13.5.5 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect's services and expenses. Any such costs shall be paid by the Owner, invoiced to the Contractor, and, among other remedies, can be withheld from progress payments and/or retention.

13.5.7 Costs for Premature Test

In the event the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, the Contractor shall be invoiced by the Owner for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Architect's fees and expenses, and the amount of the invoice can among other remedies, be withheld from

progress payments and/or retention.

13.5.8 Tests or Inspections Not to Delay Work

Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

13.6 [INTENTIONALLY LEFT BLANK]

13.7 TRENCH EXCAVATION

13.7.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Contract Sum exceeds $25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of excavation, submit to the Owner or a registered civil or structural engineer employed by the Owner a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

13.7.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the Owner or by the person to whom authority to accept has been delegated by the Owner.

13.7.3 No Tort Liability of Owner

Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the Owner or any of its employees.

13.7.4 No Excavation Without Permits

The Contractor shall not commence any excavation work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

13.8 WAGE RATES

13.8.1 Wage Rates

Pursuant to the provisions of Article 2 (commencing at § 1770), Chapter 1, Part 7, Division 2, of the Labor Code, the governing board of the Owner has obtained the general prevailing rate of

per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification, or type of worker needed for this Project from the Director of Industrial Relations ("Director"). These rates are on file with the Clerk of the Owner's governing board, and copies will be made available to any interested party on request. The Contractor shall post a copy of such wage rates at the Site.

13.8.2 Holiday and Overtime Pay

Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half (1½) times the above specified rate of per diem wages, unless otherwise specified. Holidays shall be defined in the Collective Bargaining Agreement applicable to each particular craft, classification, or type of worker employed.

13.8.3 Wage Rates Not Affected by Subcontracts

The Contractor shall pay and shall cause to be paid each worker engaged in the Work not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

13.8.4 Change in Prevailing Wage During Bid or Construction

If during the period this bid is required to remain open, the Director of Industrial Relations determines that there has been a change in any prevailing rate of per diem wages in the locality in which this public work is to be performed, such change shall not alter the wage rates discussed in the Notice to Bidders or the Contract subsequently awarded.

13.8.5 Forfeiture and Payments

Pursuant to Labor Code section 1775, the Contractor and any subcontractor under the Contractor shall as a penalty to the Owner, forfeit not more than Two Hundred Dollars ($200.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rate of per diem wages, determined by the Director, for such craft or classification in which such worker is employed for any public work done under the Agreement by the Contractor or by any Subcontractor under it. Minimum penalties shall apply, as also provided in Civil Code section 1775. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on both of the following: (1) whether the failure of the contractor or subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected upon being brought to the attention of the contractor or subcontractor; and (2) whether the contractor or subcontractor has a prior record of failing to meet its prevailing wage obligations. The difference between such prevailing rate of per diem wage and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing rate of per diem wage shall be paid to each work by the Contractor or subcontractor. Labor Code section 1777.1 shall also apply.

13.8.6 Minimum Wage Rates

Any worker employed to perform Work, which Work is not covered by any craft or classification listed in the general prevailing rate of per diem wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the craft or classification which most nearly corresponds to the Work to be performed by them, and such minimum wage rate shall be retroactive to time of initial employment of such person in such craft or classification.

13.8.7 Per Diem Wages

Pursuant to Labor Code section 1773.1, per diem wages includes employer payments for health and welfare, pension, and vacation pay.

13.8.8 Posting of Wage Rates and Other Required Job Site Notices

The Contractor shall post at appropriate conspicuous points on the Site, a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned and all other required job site notices as prescribed by regulation.

13.9 RECORD OF WAGES PAID: INSPECTION

13.9.1 Application of Labor Code

Pursuant to section 1776 of the Labor Code:

(a) Each Contractor and subcontractor shall keep accurate payroll records, showing

the name, address, social security number, work classification, and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.

(2) The employer has complied with the requirements of sections 1771, 1811 and 1815 for any work performed by his or her employees on the public works project.

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

(1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the Owner and the Division of Labor Standards Enforcement of the Department of Industrial Relations ("DIR") and as may be required by the Labor Commissioner under Labor Code section 1771.4. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner monthly or more frequently, if so specified in the Agreement and in a format the Labor Commissioner prescribes.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract or the Division of Labor Standards Enforcement of the DIR. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of the preparation by the contractor, subcontractors, and the entity through which the request was made. The public may not be given access to such records at the principal office of the Contractor.

(c) Unless required as of January 1, 2015, to be furnished directly to the Labor Commissioner under Labor Code section 1771.4(a)(3), the certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement of the DIR or shall contain the same information as the forms provided by the division. The payroll records may consist of printouts of payroll data that are maintained as

computer records, if the printouts contain the same information as the forms provided by the division and the printouts are verified in the manner specified in (a) above.

(d) A Contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested such records within 10 days after receipt of a written request.

(e) Except as provided in subdivision (f), any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body or the Division of Labor Standards Enforcement of the DIR shall be marked or obliterated to prevent disclosure of an individual's name, address and social security number. The name and address of the Contractor awarded the Contract or the subcontractor performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a multiemployer Taft-Hartley trust fund (29 U.S.C. Sec. 186(c)(5) that requests the records for the purposes of allocating contributions to participants shall be marked or obliterated only to prevent disclosure of an individual's full social security number, but shall provide the last four digits of the social security number. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (29 U.S.C. Sec. 175a) shall be marked or obliterated only to prevent disclosure of an individual's social security number.

(f) Notwithstanding any other provision of law, agencies that are included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided nonredacted copies of certified payroll records. Any copies of records or certified payroll made available for inspection and furnished upon request to the public by an agency included in the Joint Enforcement Strike Force on the Underground Economy or to a law enforcement agency investigating a violation of law shall be marked or redacted to prevent disclosure of an individual's name, address, and social security number. An employer shall not be liable for damages in a civil action for any reasonable act or omission taken in good faith in compliance with this subsection.

(g) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

(h) The contractor or subcontractor has 10 days in which to comply subsequent to receipt of written notice requesting the records enumerated in subdivision (a). In the event that the Contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the

contract is made or awarded, forfeit One Hundred Dollars ($100.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Labor Standards Enforcement of the DIR, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of the subcontractor to comply with this section.

13.10 APPRENTICES

13.10.1 Apprentice Wages and Definitions

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he or she is employed, and shall be employed only at the work of the craft or trade to which he or she is registered. Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprenticeship agreements under Chapter 4 (commencing with § 3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training. Contractor shall pay apprentices for any preemployment activities, as set forth in Labor Code section 1777.5.

13.10.2 Apprentice Labor Pool

When the Contractor to whom the Contract is awarded by the Owner, or any Subcontractor under him or her, in performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and Subcontractor shall apply to the joint apprenticeship committee administering the apprenticeship standards of the craft or trade in the area of the Site of the Project, for a certificate approving the Contractor or Subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, approval as established by the joint apprenticeship committee or committees shall be subject to the approval of the Administrator of Apprenticeship. The joint apprenticeship committee or committees, subsequent to approving the subject Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor in order to comply with this section. Every Contractor and Subcontractor shall submit the contract award information to the applicable joint apprenticeship committee which shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. There shall be an affirmative duty upon the joint apprenticeship committee or committees administering the apprenticeship standards of the crafts or trade in the area of the Site of the public work, to ensure equal employment and affirmative action and apprenticeship for women and minorities. Contractors or Subcontractors shall not be required to submit individual applications for approval to local joint apprenticeship committees provided they are already covered by the local apprenticeship standards. The ratio of work performed by apprentices to journeymen, who shall be employed in the craft or trade on the Project, may be the ratio

stipulated in the apprenticeship standards under which the joint apprenticeship committee operates, but, except as otherwise provided in this section, in no case shall the ratio be less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman. However, the minimum ratio for the land surveyor classification shall not be less than one (1) apprentice for each five (5) journeymen.

13.10.3 Journeyman/Apprentice Ratio; Computation of Hours

Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the joint apprenticeship committee, is employed at the job Site and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the land surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the end of the Contract. However, the Contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the job Site. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a joint apprenticeship committee, may order a minimum ratio of not less than one (1) apprentice for each five (5) journeymen in a craft or trade classification.

13.10.4 Journeyman/Apprentice Ratio

The Contractor or Subcontractor, if he or she is covered by this section upon the issuance of the approval certificate, or if he or she has been previously approved in the craft or trade, shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the apprenticeship standards. Upon proper showing by the Contractor that he or she employs apprentices in the craft or trade in the state on all of his or her contracts on an annual average of not less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman, or in the land surveyor classification, one (1) apprentice for each five (5) journeymen, the Division of Apprenticeship Standards may grant a certificate exempting the Contractor from the 1-to-5 hourly ratio as set forth in this section. This section shall not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor, when the contracts of general contractors or those specialty contractors involve less than Thirty Thousand Dollars ($30,000) or twenty (20) working days. Any work performed by a journeyman in excess of eight (8) hours per day or forty (40) hours per week, shall not be used to calculate the hourly ratio required by this section.

13.10.4.1 ***Apprenticeable Craft or Trade.*** "Apprenticeable craft or trade" as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The joint apprenticeship committee shall have the discretion to grant a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting a Contractor from the 1-to-5 ratio set forth in this Article when it finds that any one of the following conditions is met:

A. Unemployment for the previous three-month period in the area exceeds an average of fifteen percent (15%).

B. The number of apprentices in training in such area exceeds a ratio of 1-to-5.

C. There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth (1/30) of its journeymen annually through the apprenticeship training, either on a statewide basis or on a local basis.

D. Assignment of an apprentice to any work performed under this contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman.

13.10.5 Ratio Exemption

When exemptions are granted to an organization which represents Contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member Contractors will not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

13.10.6 Apprentice Fund

A Contractor to whom the Contract is awarded or any Subcontractor under him or her, who, in performing any of the work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the Site of the Project, to which fund or funds other contractors in the area of the Site of the Project are contributing, shall contribute to the fund or funds in each craft or trade in which he or she employs journeymen or apprentices on the Project in the same amount or upon the same basis and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept the funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The Contractor or Subcontractor may add the amount of the contributions in computing his or her bid for the contract. The Division of Labor Standards Enforcement is authorized to enforce the payment of the contributions to the fund or funds as set forth in the Labor Code section 227.

13.10.7 Prime Contractor Compliance

The responsibility of compliance with section 13.10 and section 1777.5 of the Labor Code for all apprenticeable occupations is with the Contractor.

13.10.8 Decisions of Joint Apprenticeship Committee

All decisions of the joint apprenticeship committee under this section13.10 and Labor Code section 1777.5 are subject to Labor Code section 3081.

13.10.9 No Bias

It shall be unlawful for an employer or a labor union to refuse to accept otherwise qualified employees as registered apprentices on any public works on the grounds of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in the Labor Code section 3077.

13.10.10 Violation of Labor Code

Pursuant to Labor Code sections 1777.1 and 1777.7, in the event a Contractor or Subcontractor fails to comply with the provisions of this section 13.10 and Labor Code section 1777.5, penalties shall apply, including among other things:

(a) If a Contractor or Subcontractor willfully fails to comply, the Labor Commissioner may deny to the contractor or subcontractor, and to its responsible officers, the right to bid on, or be awarded or perform work as a subcontractor on, any public works project for a period of up to one year for the first violation and for a period of up to three years for the second and subsequent violation. Each period of debarment shall run from the date the determination of noncompliance by the Labor Commissioner becomes a final order.

(b) A contractor or subcontractor who violates section 1777.5 shall forfeit as a civil penalty an amount not exceeding the sum of One Hundred Dollars ($100) for each full calendar day of noncompliance. Upon receipt of a determination that a civil penalty has been imposed, the awarding body shall enforce the penalty, which includes withholding the amount of the civil penalty from the contract progress payments or retention then due or to become due.

(c) In lieu of the penalty provided, the Labor Commissioner may for a first time violation and with the concurrence of an applicable apprenticeship program, order the contractor or subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance.

(d) Any funds withheld by the awarding body pursuant to this section shall be deposited in the General Fund.

(e) The interpretation and enforcement of section 1777.5 and this section shall be in accordance with the regulations of the California Apprenticeship Council.

Pursuant to Public Contract Code section 6109, no contractor or subcontractor may bid on, be awarded, or perform work as a subcontractor on a public works project if ineligible to bid or work on, or be awarded, a public works project pursuant to section 1777.1 of the Labor Code.

13.11 ASSIGNMENT OF ANTITRUST CLAIMS

13.11.1 Application

Pursuant to Public Contract Code section 7103.5 and Government Code section 4552, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the Owner all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Bus. & Prof. Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders Final Progress Payment to the Contractor, without further acknowledgment by the parties. If the Owner receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, the assignor may, upon demand, recover from the Owner any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the Owner as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

13.11.2 Assignment of Claim

Upon demand in writing by the assignor, the Owner shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the Owner has not been injured thereby or the Owner declines to file a court action for the cause of action.

13.12 **AUDIT**

Pursuant to and in accordance with the provisions of Government Code section 8546.7, or any amendments thereto, all books, records, and files of the Owner, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state funds in excess of Ten Thousand Dollars ($10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of three (3) years after release of all retention under this Contract. Contractor shall preserve and cause to be preserved such books, records, and files for the audit period.

During the progress of the Work and for three (3) years after Completion of the Work, Owner shall also have the right to an audit of all of Contractor's books, records, subcontracts, material and equipment contracts, files, and information related to the Contract, and Contractor must cooperate by producing all requested items within seven (7) days for inspection or copying by Owner.

13.13 **STORM WATER DISCHARGE PERMIT**

If applicable, the Contractor shall file a Notice of Intent to comply with the terms of the general permit to discharge storm water associated with construction activity (WQ Order No. 920-08-DWQ). The Notice of Intent must be sent to the following address along with the appropriate payment (warrant to be furnished by the Owner upon request by the Contractor, allow warrant processing time.): California State Water Resources Control Board, Division of Water Quality, Storm Water Permit Unit, P.O. Box 1977, Sacramento, CA 95812-1977. The Contractor may also call the State Water Board's Construction Activity Storm Water Hotline at (916) 657-1146. The Notice of Intent shall be filed prior to the start of any construction activity.

13.14 **USE OF LEAD PAINT, PLUMBING, ETC. PROHIBITED** {TC "13.14 USE OF LEAD PAINT, PLUMBING, ETC. PROHIBITED"}

New school facilities under construction, or school facilities undergoing a modernization or renovation program, shall not utilize lead-based paint, lead plumbing or solders, or other potential sources of lead contamination (added by stats. 1992, c. 1317 (A.B. 1659) of General Education Code Provisions).

The California Health and Safety Code, Section 116875, effective January 1, 2010, states in part and requires that, no person shall use any pipe, pipe or plumbing fitting or fixture, or solder or flux that is not lead free in the installation or repair of any public water system or any plumbing in a facility providing for human consumption.

Water from new, contractor-installed drinking water fixtures shall meet current EPA requirements for drinking water. Drinking water fixtures will be considered non-compliant items subject to correction at no additional cost to the Owner. Drinking water fixtures include all fixtures that are

likely sources of drinking water including but not limited to; drinking fountains, classroom sinks and bubblers, kitchen sinks, faculty sinks and nurse sinks.

Contractor shall adequately flush all newly installed drinking water fixtures prior to testing. Drinking water fixtures shall be flushed multiple times daily for a minimum of two weeks prior to testing.

Where drinking water fixtures have been installed but not tested, or where drinking water fixtures have not met the requirements specified herein, Contractor shall flush each fixture multiple times per day and maintain a detailed and accurate flushing log until such time acceptable testing results are achieved. At a minimum, Contractor shall be required to flush each drinking water fixture prior to the start of school each day.

Flushing logs must include dates, times and duration for each flushing event at each fixture. Contractor must sign and certify flushing logs are true and accurate and submit to the Owner on a weekly basis.

Upon completion of final cleaning, Contractor shall request final test and acceptance of dust wipe sampling for lead. Contractor shall give the Owner and Owner's Environmental Consultant forty-eight (48) hours written notice, excluding weekends and Owner holidays, of when and where testing is required. All test and acceptance dust wipe samples shall be below 10 micrograms of lead per square foot prior to occupancy.

ARTICLE 14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE

Contractor may not terminate performance for convenience. Contractor may only terminate performance for cause if the Work is stopped by others for a period of one hundred eighty (180) consecutive days through no act or fault of the Contractor, a Subcontractor of any tier, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, **and** the Work was stopped by others for one of the following reasons: (A) Issuance of an order of a court or other public authority having jurisdiction which requires Owner to stop all Work; or (B) an act of government, such as a declaration of national emergency, making material unavailable which requires Owner to stop all Work. If such grounds exist, the Contractor may serve written notice of such grounds on Owner and demand a meet-and-confer conference to negotiate a resolution in good faith within twenty (20) days of Owner's receipt of such notice. If such conference does not lead to resolution and the grounds for termination still exist, Contractor may terminate the Contract and recover from the Owner payment for Work executed and for reasonable verified costs with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable

overhead, profit, and damages for the Work executed, but excluding overhead (field and home office) and profit for (i) Work not performed and (ii) the period of time that the Work was stopped.

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 Grounds for Termination

The Owner may terminate performance of the Contract for cause if the Contractor:

A. Refuses or fails to supply enough properly skilled workers or proper materials, or refuses or fails to take steps to adequately prosecute the Work to meet a Milestone Deadline or to Complete within the Contract Time;

B. Fails to make payment to Subcontractors for materials or labor in accordance with Public Contract Code section 10262 or Business and Professions Code section 7108.5, as applicable;

C. Violates Labor Code section 1771.1(a), subject to the provisions of Labor Code section 1771.1(f);

D. Disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction; or

E. Otherwise is in breach of the Contract Documents.

14.2.2 Notification of Termination

When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner, give notice to Contractor of the grounds for termination and demand cure of the grounds within seven (7) days (a “Notice of Intent to Terminate”). Owner has the discretion to include in its Notice of Intent to Terminate an option for the Contractor to reasonably commence cure of the grounds for termination within seven (7) days and reasonably continue to cure the grounds for termination until such cure is complete.

Owner may terminate the performance of the Contract for cause if (a) Contractor fails to completely cure the grounds for termination within seven (7) days, and (b) Contractor fails to reasonably commence cure of the grounds for termination within seven (7) days and reasonably continue to cure the grounds for termination until such cure is complete (if Owner had offered this alternative to Contractor in its Notice of Intent to Terminate). If the Contractor attempts to cure the grounds for termination but the attempted cure causes additional breaches of the Contract, then Owner may still terminate performance of the Contract for cause since the attempted cure would not be reasonable.

Such termination shall be effective immediately upon service of a written Notice of Termination,

and Owner may, subject to any prior rights of Contractor's surety on the performance bond ("Surety"), do the following:

A. Take possession of the Site and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

B. Accept assignment of subcontracts pursuant to section 5.4; and

C. Complete the Work by whatever reasonable method the Owner may deem expedient, including the tender of Completion to the Surety or the hire of another contractor to Complete the Work.

14.2.3 Payments

If the Owner terminates performance of the Contract for one of the reasons stated in section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is Complete.

If the unpaid balance of the Contract Sum exceeds costs of Completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor and its Surety shall pay the difference to the Owner. This payment obligation shall survive Completion of the Work.

14.2.4 Wrongful Termination

To claim a breach of contract or violation of law based on alleged wrongful termination for cause by the Owner, or if Contractor otherwise seeks any payment or damages related to a termination, within fifteen (15) days of the alleged breach of contract, violation of law, or wrongful termination Contractor shall submit a Claim pursuant and subject to Sections 4.5.3-4.5.6. The Contractor need not submit a Notice of Potential Change or a Change Order Request.

14.2.5 Inclusion of Termination for Convenience

Any purported termination by Owner for cause under this section 14.2, which is revoked or determined to not have been for cause, shall be deemed to have been a termination for convenience effective as of the same date as the purported termination for cause.

14.3 SUSPENSION OR TERMINATION BY THE OWNER FOR CONVENIENCE

14.3.1 Suspension by Owner

The Owner may, without cause, order the Contractor in writing to suspend, delay, or interrupt the

Work in whole or in part for such period of time as the Owner may determine.

14.3.1.1 ***Adjustments.*** An adjustment shall be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance caused by suspension, delay, or interruption. No adjustment shall be made to the extent:

A. That performance is, was or would have been so suspended, delayed, or interrupted by another cause for which the Contractor is responsible; or

B. That an equitable adjustment is made or denied under another provision of this Contract.

14.3.1.2 ***Adjustments for Fixed Cost.*** Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

14.3.2 **Termination by the Owner for Convenience**

14.3.2.1 The Owner may, at any time, terminate performance of the Contract for the Owner's convenience and without cause.

14.3.2.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

1. Cease operations as directed by the Owner in the notice;

2. Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

3. Except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

14.3.2.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

14.4 NOT A WAIVER

Any suspension or termination by Owner of performance by Contractor for convenience or cause under this Article 14 shall not act as a waiver of any claims by Owner against Contractor or others for damages based on breach of contract, negligence or other grounds.

14.5 MUTUAL TERMINATION FOR CONVENIENCE

The Contractor and the Owner may mutually agree in writing to terminate performance of this Contract for convenience. The Contractor shall receive payment for all Work performed to the date of termination in accordance with the provisions of Article 9.

14.6 EARLY TERMINATION

Notwithstanding any provision herein to the contrary, if for any fiscal year of this Contract the governing body of the Owner fails to appropriate or allocate funds for future periodic payments under the Contract after exercising reasonable efforts to do so, the Owner may upon thirty (30) days' notice, order Work on the Project to cease. The Owner will remain obligated to pay for the Work already performed but shall not be obligated to pay the balance remaining unpaid beyond the fiscal period for which funds have been appropriated or allocated and for which the Work has not been done.

SECTION 01 1100

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work covered by Contract Documents.

B. Work under separate contracts.

C. Execution, correlation and intent.

D. Acceptance of site.

E. Related documents.

F. Contractor's use of premises.

G. Access.

H. Existing conditions.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Project name is:

TENNYSON HIGH SCHOOL BUILDING G MODERIZATION

as shown on the Contract Documents prepared by Quattrocchi-Kwok Architects and briefly described as:

Modernization of portions of building G: Locker rooms, ~~dance room, weight room~~ and accessory areas. No work in the gymnasium is anticipated. Work includes wall and floor finishes, some ceiling finishes, nonbearing partition walls, new plumbing and fixtures, new lockers and benches and decorative metal screen enclosure.

B. The Work shall be constructed under single fixed-price Contract.

C. The Work of the Contract includes but is not necessarily limited to:

1. Selective demolition, hazardous material abatement and construction necessary for the modernization of existing school building, including associated architectural, structural, plumbing, mechanical and/or electrical work as indicated in the Drawings and Specifications. Generally these categories of work involve new finishes, adaptive re-use and modification of certain selected areas, accessibility modernization. The Project will involve construction phasing and barricading of work areas as required to separate construction areas from occupied spaces and as needed to accommodate the Owner's schedule and use of the site.

2. All other work as shown in the Contract Documents.

3. The Work shall include all labor, materials and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents, including but not limited to:
   a. Home office overhead,
   b. Off-Site supervision,
   c. Project Administration including preparation, research and distribution of project correspondence and submittals,
   d. Schedule preparation and maintenance,
   e. Guarantys and warrantys,
   f. On-Site supervision,
   g. Temporary protection,
   h. Temporary utilities and facilities, including mobilization and demobilization,
   i. Material handling and storage,
   j. Safety equipment,
   k. Travel time to and from the Site to the Contractor's home office.

D. Sequence the Work subject to the Owner's use of the site, the requirements of the Construction Phasing, Technical Specifications and the Contract provisions for Liquidated Damages found elsewhere in these documents.

E. Perform work indicated or required to produce finished results shown.

F. Contractor shall coordinate all work and shall be responsible for division of work among the various subcontractors.
   1. Coordinate the work of this Contract with the activities of the Owner, and with PG&E and other serving utilities.
   2. Coordinate the work of this Contract with the activities of the Owner's separate contractors, including those for removal or abatement of Hazardous Materials.

G. Laws and Regulations: Intent of the Contract Documents is to construct the Work shown therein, in accordance with applicable codes and regulations.

1.03 WORK UNDER SEPARATE CONTRACTS

A. Serving Utilities may be performing certain utility work concurrent with this Contract.

1.04 EXECUTION, CORRELATION AND INTENT

A. Correlation and Intent
   1. Documents Complementary and Inclusive:
      a. The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work.
      b. Any item of work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both.
   2. Coverage of the Drawings and Specifications:
      a. The Drawings and Specifications generally describe the work to be performed by Contractor. Generally, the Specifications describe work which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work.

b. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown.
c. All materials or labor for Work, which is shown on either by the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to complete the Work), shall be provided by the Contractor whether or not the Work is expressly covered in either the Drawings and/or the Specifications.
d. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by them.

3. Conflicts. In the event there is a discrepancy between the various Contract Documents, the Owner/Contractor Agreement shall control. Without limiting Contractor's obligation to identify conflicts for resolution by the Architect identified elsewhere in this Article it is intended that the more stringent, higher quality, and greater quantity of Work shall apply.
4. Conformance With Laws:
   a. Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party the Contract shall be amended in writing to make such insertion or correction.
   b. Before commencing any portion of the Work, Contractor shall check and review the Contract Documents for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents.
   c. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with any such restrictions or special requirements of the Contract Documents, Contractor shall immediately notify Architect in writing of same and shall cause to be corrected any such violation or inconsistency in the manner provided hereunder.
5. Ambiguity:
   a. Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements.
   b. Contractor shall immediately notify Owner and Architect of any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein.
   c. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Price or the time for performance.

d. If Contractor performs, permits, or causes the performance of any Work under the Contract Documents prepared by or on behalf of Contractor which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction, without increase to or adjustment in the Contract Price or the time for performance.
e. In no case shall any Subcontractor proceed with the Work if uncertain without the Contractor's written direction and/or approval.

B. Addenda and Deferred Approvals
1. Addenda. Addenda shall govern over all other Contract Documents. Subsequent addenda issued shall govern over prior addenda only to the extent specified. In accordance with Title 24, California Code of Regulations, addenda shall be approved by the DSA.
2. Deferred Approvals. The requirements approved by the DSA on any item submitted as a deferred approval in accordance with Title 24, California Code of Regulations, shall take precedence over any previously issued addenda, drawing or specification.

C. Specification Interpretation and Application:
1. Titles. The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved.
2. As Shown, Etc. Where "as shown," "as indicated," "as detailed," or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where "as directed," "as required," "as permitted," "as authorized," "as accepted," "as selected," or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.
3 Provide. "Provide" means "provided complete in place," that is, furnished, installed, tested, and ready for operation and use.
4. General Conditions. The General Conditions and supplementary general conditions are a part of each and every section of the Specifications.
5. Abbreviations.
a. In the interest of brevity, the Specifications are generally written in an abbreviated form in the imperative tense and may not include complete sentences.
b. Omission of words or phrases such as "Contractor shall," "shall be," etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory and directed to the Contractor.
c. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.
6. Plural. Words in the singular shall include the plural whenever applicable or the context so indicates.
7. Metric. The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1" (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the "International System of Units" (SI) and generally follow ASTM E 380, "Standard for Metric Practice."
8. Standard Specifications. Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization's standard specifications, which are in effect at the date of the Contractor's proposal.
a. If applicable specifications are revised prior to completion of any part of the Work, the Contractor may, if acceptable to Architect, perform such Work in accordance with the revised specifications.

b. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.
c. Procurement of reference standards and standard specifications is the sole responsibility of the Contractor.

9. Absence of Modifiers. In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another shall not affect the interpretation of either statement.

D. Rules of Document Interpretation
1. In the event of conflict or ambiguity within the drawings, the following rules shall apply:
a. General Notes, when identified as such, shall be incorporated into other portions of Drawings.
b. Schedules, when identified as such, are complementary with other notes and other portions of Drawings including those identified as General Notes.
c. Larger scale drawings shall take precedence over smaller scale drawings.
d. General or Typical Details and Symbols apply at all locations where specifically noted; at all locations conforming to the title of the Detail; at all locations of similar or identical graphic indication; at all locations where similar conditions are not fully or specifically shown or identified and complement similar details of specific conditions.
e. Details and Notes apply at all locations of similar or identical graphic indications and at all locations where similar conditions are not fully or specifically shown or identified.
f. Limitation of Indication does not affect Extent of Application: Indications of notes, details, and symbols may be limited to promote clarity. No limitation of application is intended nor shall be construed unless specifically noted.
g. Figured, derived, or numerical dimensions shall govern. At no time shall the Contractor base construction on scaled drawings.
2. Specifications shall govern as to materials, workmanship, and installation procedures.
3. In the case of disagreement or conflict between or within standards, specifications, and drawings, the more stringent, higher quality, and greater quantity of Work shall apply.

1.05 ACCEPTANCE OF SITE

A. Contractor shall accept the site in the condition in which it exists at the time it is given Notice to Proceed.

1.06 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contact, including General and Supplementary Conditions and other Division 1 specifications apply to the Work of this Section.

1.07 CONTRACTOR'S USE OF PREMISES

A. Confine operations on the site to areas indicated in the Contract Documents. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the Work while engaged in project construction.

B. Contractor shall limit its use of the premises for work and storage to allow for work by other contractors.

C. Maintain existing driveways and entrances serving the premises clear and available to the Owner and its employees at all times. Do not use these areas for parking or storage of materials.

D. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to area approved by the Architect. If additional storage is necessary, Contractor shall obtain and pay for such storage off site without additional expense to the Owner.

E. Do not overload structures with weight that will endanger them.

F. Assume full responsibility for protection and safekeeping of materials and tools stored at the site. Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.

G. Move any stored products, temporary facilities, controls or fencing, under Contractor's control, which interfere with operations of the Owner or separate contractors, on or off the site, without cost to the Owner.

H. Contractor shall cooperate with Owner and governing authorities to minimize disturbance. Observe all local ordinances for timing of work.

I. In entrance and exit of all workmen and in bringing in, storing and removal of equipment, Contractor shall avoid unnecessary dust, mud or accumulated debris, or undue interference with the convenience, sanitation or routine of Owner's activities.

J. In connecting new utilities to existing, and similar operations, Contractor shall time and coordinate such operations so that there will be no interference with Owner's activities.

K. Protect improvements on adjoining properties as well as those on the Owner's property.

L. Restore any improvements damaged by this work to their original condition as acceptable to the Owner.

M. Do not interfere with use of adjacent buildings. Maintain free and safe passage to and from.

N. Contractor shall be responsible for safety and support of structure. Cease operations and notify Architect immediately if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored. Contractor shall assume liability for such movement, settlement, damage or injury.

O. Provide, erect and maintain barricades and guard rails as required by governing regulatory agencies to protect occupants of building and workers.

P. Where demolition, removal or rework occurs, take all necessary precautions to protect existing finished work remaining in place from damage. Finished work damaged by operations under this contract shall be repaired or replaced to the satisfaction of Owner and Architect at no extra cost to the Owner.

1.08 OWNER'S USE OF THE SITE

A. Owner will remain in continuous occupancy of the site. Summer School, community use of athletic fields, after-hours Daycare and other site programs will be concurrent with this Contract. Owner reserves the right to limit hours of construction access and deliveries to avoid traffic conflicts during peak periods.

B. Certain on and off-site work will be performed by others. A portion of this work, including the completion of preceding contracts, may be constructed concurrently with this Contract. The District will have various additional contracts for summer work and other projects from time-to-time on the site concurrent with this Contract.

C. Portions of the regular school year may be concurrent with this Contract.

D. Owner's Use of Concurrent or Related Contracts: The Owner may occupy certain portions of the work of other contracts listed above prior to the completion of the work of this Contract. Make all allowances and include all sums necessary in the Bid Proposal to accommodate the Owner's occupancy of these neighboring areas.

1.09 ACCESS

A. During the life of the Contract, maintain access to the site, and within the site to the building, for fire-fighting equipment, ambulance and police vehicles in accord with local fire marshal regulations.
   1. The Work of this Contract shall be performed, and such temporary facilities and phasing of activities provided, so as not to interfere with access to adjacent facilities or new work areas, so as to cause the least possible interference with activities of other contractors, the Owner's personnel or the public, and so as to protect persons and property from harm. Required accessways, and other accessways not required but so designated by the Owner or the Contract Documents, shall not be blocked.
   2. No utility service, such as water, gas, sewers, electricity, communication or fire protection system serving the project, or any part of it, shall be interrupted without prior written approval of the Owner.

B. The DISTRICT has considered the totality of the circumstances concerning the Project and the CONTRACTOR and CONTRACTOR's employees (which includes Subcontractor employees) subjection to the FINGERPRINTING REQUIREMENTS of Education Code Section 45125.2. **Contractor shall comply with the determination regarding fingerprint certification as defined in the general conditions**.

C. Contractor acknowledges that access to the project following occupancy by the Owner shall be subject to the requirements of Education Code Section 45125.2 as set forth in the General Conditions of the Contract and further acknowledges that all sums necessary to implement such compliance are included in the Bid Proposal.

D. Contractor is notified that the Site is congested, with limited access. It shall be the Contractor's responsibility to coordinate Contractor's Work with the Work of other Prime Contractors performing work on the site. Areas designated by the Owner shall remain off-limits to construction personnel and equipment during construction.

E. Contractor is hereby notified that the project site borders a residential neighborhood. Contractor acknowledges that the Work shall be performed during regular business hours. Contractor shall make provisions for the safety of residents and the general public adjacent to the site while working in proximity to the these areas or while working off-site.

1.10 EXISTING CONDITIONS

A. Intent of the Drawings is to show existing conditions with information developed from field surveys and Owner's records, and to generally show the extent and type of work required to prepare the existing areas for new work. The information shown on the Drawings is not a guarantee of existing conditions.

B. Should any existing conditions such as deterioration or noncomplying construction be discovered that is not covered by the DSA approved documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work.

1.11 LIQUIDATED DAMAGES AND CONTRACT COMPLETION

A. Liquidated Damages will be assessed beginning on the Date contractually required for Completion and shall continue to accrue until each of the listed conditions are fulfilled.

B. Date of Completion and Beneficial Occupancy is defined as the Date of Completion of all punch list items, including, but not limited to the following:
   1. Confirmation of mechanical and electrical systems testing and balancing, control sequences and operations.
   2. Completion of final cleaning, paint touch-up and adjusting.
   3. Adjustment and Contractor's certification of the finish hardware operation.
   4. Removal of Contractor's temporary facilities and materials.
   3. Owner's acceptance of the Work.

C. Owner's occupancy prior to completion of any or all of the above items, or other such missing or incomplete work as may occur, shall not be construed as acceptance of the Work or as Completion when defined for the purposes of assessing Liquidated Damages.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

SECTION 01 2100

ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cash allowances: Include cash allowance in Schedule of Values as separate line item of the specified amount.

B. Cash allowance will be charged against for only the specified purposes under force account procedure described in the General Conditions.

C. Cash allowance remaining at completion will be deducted from the Contract Sum by Change Order.

1.02 RELATED SECTIONS

A. Section 01 2600 - Modification Procedures: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Cost of Work to Contractor or Subcontractor, less applicable trade discounts, applicable taxes, and including disposal fees.

B. Costs Not Included in Cash Allowances: Handling at the site, including unloading, mobilization and storage; protection of Work from elements and from damage; temporary facilities and labor for finishing. Costs for these items shall be included in the Contract Sum.

C. Architect/Engineer Responsibilities:
1. Consult with Contractor for consideration concerning demolition and replacement-in-kind.
2. Review force account receipts and submittals.

D. Owner/Inspector of Record Responsibilities:
1. Verify quantities and types of materials.
2. Verify delivery tickets and cost verification back-up submittals.
3. Verify labor quantities and rates.

D. Contractor Responsibilities:
1. Prepare documentation and offer recommendations to Architect.
2. Arrange for and process force account submittals. Arrange for removal of demolished materials.

E. Changes in materials quantities and labor will be adjusted by force account procedures.

1.04 PROCEDURES

A. All labor and materials compensated under this Allowance shall be performed under the continuous observation of the Inspector of Record. Labor and materials quantities for a given period will be reviewed and signed by the Inspector of Record.

B. Charges for these Inspector-approved quantities may be debited from the Allowance section of the Schedule of Values on the Application for Payment, AIA G703. . Include all signed original submittals as exhibits for the Application for Payment.

C. Allowance sums remaining at completion will be deducted from the Contract Sum by Change Order.

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

3.01 ALLOWANCES SCHEDULE

END OF SECTION

SECTION 01 2200

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Measurement and payment criteria applicable to portions of the Work performed under a unit price payment method.

B. Defect assessment and non-payment for rejected work.

1.02 AUTHORITY

A. Measurement methods delineated in the individual specification sections complement the criteria of this section.

B. Architect/Engineer Responsibilities:
1. Take all measurements and compute quantities accordingly.
2. Consult with Contractor for consideration concerning demolition and replacement-in-kind.
3. Review force account receipts and submittals.

C. Contractor Responsibilities:
1. Prepare documentation and offer recommendations to Architect.
2. Arrange for and process unit price submittals. Arrange for delivery or removal of materials.
3. Assist by providing necessary equipment, workers, and survey personnel as required.

D. Owner/Inspector of Record Responsibilities:
1. Verify quantities and types of materials.
2. Verify delivery tickets and cost verification back-up submittals.
3. Verify labor quantities and rates.

E. Changes in unit price quantities will be adjusted by change order procedures.

1.03 UNIT QUANTITIES SPECIFIED

A. Quantities and measurements supplied or placed in the Work and verified by the Architect/Engineer determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.

1.05 PAYMENT

A. Payment Includes: Full compensation for all required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Architect/Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

1.06 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Owner will direct one of the following remedies:
   1. The defective Work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the Owner.
   2. The defective Work will be partially repaired to the instructions of the Architect/Engineer and the unit sum/price will be adjusted to a new sum/price at the discretion of the Owner.

C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.

D. The authority of the Architect/Engineer to assess the defect and identify payment adjustment is final.

1.07 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:
   1. Products wasted or disposed of in a manner that is not acceptable.
   2. Products determined as unacceptable before or after placement.
   3. Products not completely unloaded from the transporting vehicle.
   4. Products placed beyond the lines and levels of the required Work.
   5. Products remaining on hand after completion of the Work.
   6. Loading, hauling, and disposing of rejected Products.

1.08 SCHEDULE OF UNIT PRICES

A. Item: To be determined.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 2300

ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Alternative submission procedures.

B. Documentation of changes to Contract Sum and Contract Time.

1.02 RELATED SECTIONS

A. Document 00 2113 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.

B. Document 00 5200 - Contract: Incorporating monetary value of accepted alternatives.

1.03 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work to integrate the Work of each alternative.

1.04 SCHEDULE OF ALTERNATES

A. Alternative No. ____ - _____:
   1. Base Bid Item: Section _____ and Drawing number ____ including _____.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2600

MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. Documentation of change in Contract Sum and Contract Time.

C. Change procedures.

D. Execution of change orders.

E. Correlation of Contractor submittals.

1.02 RELATED SECTIONS

A. Document - Agreement: Monetary values of established Unit Prices.

B. Document - General Conditions and Supplementary General Conditions: Governing requirements for changes in the Work, in Contract Sum and Contract Time and percentage allowances for Contractor's overhead and profit.

C. Section 01 2900 - Applications for Payment: Payment applications and Schedule of Values.

D. Section 01 3200 - Construction Progress Schedules: Work schedule.

E. Section 01 6000 - Material and Equipment: Product options and substitutions.

F. Section 01 7000 - Contract Closeout: Project record documents.

1.03 SUBMITTALS

A. Submit name of the individual in Contractor's firm authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The following submittals shall be made on forms prepared by the Architect:
   1. Request For Information Forms.
   2. Architect's Supplemental Instructions Forms.
   3. Request For Proposal Forms.
   4. Change Order Forms.

1.04 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Maintain detailed records of work done. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. Provide additional data to support computations:
   1. Quantities of products, labor, and equipment.
   2. Taxes, insurance, and bonds.
   3. Overhead and profit.
   4. Justification for any change in Contract Time.
   5. Credit for deletions from Contract, similarly documented.

1.05 REQUEST FOR INFORMATION ("RFI")

A. An RFI is a written request prepared by the Contractor asking the Architect to provide additional information necessary to clarify an item which the Contractor feels is not clearly shown or called for in the drawings or specifications, or to address questions which have arisen under field conditions.
   1. RFI's shall be submitted by the Contractor to the Architect on the form which is included in the project. Submittals not conforming to this requirement will be returned.

B. The RFI shall reference all the applicable Contract Documents including specification section, detail, page numbers, drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and/or interpretations of the issue raised by the RFI. An RFI cannot modify the Contract Cost, Contract Time, or the Contract Documents.

C. The Architect must respond to a RFI within fourteen (14) calendar days after receiving such request. If the Architect cannot respond to the RFI within fourteen (14) calendar days, the Architect shall notify the Contractor, with a copy to the Inspector and the Owner, of the amount of time that will be required to respond.

D. The Contractor shall be invoiced by the Owner for any costs incurred for professional services, which shall be deducted from the next progress payment, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request.

1.06 ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS ("ASI")

A. An ASI is a written supplemental instruction issued and signed by the Architect for minor changes to the Work, without change in Contract Sum or Contract Time.

B. Architect Authority;
   1. The Architect will have authority to order minor changes in the Work not involving any adjustment in the Contract Sum, an extension of the Contract Time, or a change which is inconsistent with the intent of the Contract Documents.
   2. Such changes shall be effected by written Change Order and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

1.07 REQUEST FOR PROPOSAL ("RFP")

A. An RFP is a written request prepared by the Architect asking the Contractor to submit to the Owner and the Architect an estimate of the effect of a proposed change on the Contract Price and the Contract Time.

B. An RFP shall contain adequate information, including any necessary drawings and specifications, to enable Contractor to provide the cost breakdowns.

C. Owner or Architect may initiate changes by submitting a proposal request to Contractor. Request will include:
   1. Detailed description of the change, products and location of the change in the project.
   2. Supplementary or revised drawings and specifications.
   3. The projected time span for making the change and a specific statement as to whether overtime work is, or is not, authorized.
   4. A specific period of time during which the requested price will be considered valid.
   5. Such request is for information only and is not an instruction to execute the changes nor to stop work in progress.

D. The Contractor shall not be entitled to any Additional Compensation for preparing a response to an RFP, whether ultimately accepted or not.

1.08 CHANGE ORDER REQUEST ("COR")

A. Definition: A COR is a written request prepared by the Contractor asking the Owner and the Architect to incorporate a proposed change called for in an RFP or a claim into a Change Order.

B. Changes in Price: Include breakdowns as required in the Article for FORMAT FOR CHANGE ORDER REQUEST to validate any change in Contract Price due to proposed change or claim.

C. Changes in Time: A COR shall also include any additional time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined in the General Conditions and Division 1 of the Specifications.

D. Scope of Costs: Within ten (10) days or such lesser period of time as may be required by Owner after a request is made for a change that impacts the Contract Sum or the Contract Time, provide to the Owner and the Architect in writing an estimate of the effect of the proposed Change upon the Contract Price and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing the following required for the change: actual quantities and unit prices of materials, labor hours, wage rates, the effect upon the Contract Time of such Change.

E. Determination of Cost: The amount of the increase or decrease in the Contract Price resulting from a CO, if any, shall be determined in one or more of the following ways as applicable to a specific situation:
   1. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
   2. Unit prices stated in the Contractor's original bid, the Contract Documents, or subsequently agreed upon between the Owner and the Contractor;

3. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
4. By cost of material and labor and percentage of overhead and profit.

F. Determination of Costs by Material and labor and Percentage of overheard and profit: If the value is determined by this method the following requirements shall apply:
   1. Daily Reports by Contractor.
      a. General: At the close of each working day, the Contractor shall submit a daily report to the Inspector, on forms approved by the Owner, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, the location of the Work, and for other services and expenditures when authorized concerning extra work items. An attempt shall be made to reconcile the report daily, and it shall be signed by the Inspector and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by subcontractors or others shall be submitted through the Contractor.
      b. Labor: Show names of workers, classifications, and hours worked.
      c. Materials: Describe and list quantities of materials used.
      d. Equipment: Show type of equipment, size, identification number, and hours of operation, including, if applicable, loading and transportation.
      e. Other Services and Expenditures: Describe in such detail as the Owner may require.

G. Basis for Establishing Costs for Change Orders:
   1. Labor will be the actual cost for wages prevailing locally for each craft or type of workers at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements.
   2. Labor Unit Productivity for a given task or trade shall not be calculated at a lesser productivity than that published by industry references as follows:
      a. Mechanical Trades: SMACNA productivity rates increased by 30 percent (30 percent greater productivity for a given task than specified by the reference).
      b. Electrical and Division 26 Trades: NECA productivity rates increased by 30 percent (30 percent greater productivity for a given task than specified by the reference).
      c. All Other Trades: Lee Saylor Estimating Guide productivity using the "Open Shop Rate" for both labor and materials.
   3. Only costs for direct labor related to the Changed or Added Work shall be included. Supervision, Project Manager, Project Engineer, Assistant Superintendent, research and preparation of Change Order Requests and other similar classifications shall be included in the calculation for overhead and not listed separately as line items.
   4. The use of a labor classification, which would increase the extra work cost, will not be permitted unless the Contractor establishes the necessity for such additional costs.
   5. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.
   6. Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery.
   7. The Owner reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the Owner.

8. Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $100 or less.
9. Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the work is performed.
10. The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.
11. Necessary loading and transportation costs for equipment used on the extra work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the Owner than holding it at the work Site, it shall be returned unless the Contractor elects to keep it at the work Site at no expense to the Owner.
12. Other Items. The Owner may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.
13. Invoices. Vendors' invoices for material, equipment rental and other expenditures shall be submitted with the COR. If the request for payment is not substantiated by invoices or other documentation, the Owner may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.
14. Overhead. Overhead, including direct and indirect costs shall be included in the line item amount shown in the Article FORMAT FOR PROPOSED COST CHANGE, shall be submitted with the COR and shall include all of the following:
    a. Home office overhead,
    b. Off-Site supervision,
    c. Change Order and Change Order Request preparation/negotiation/research,
    d. Schedule delays,
    e. Project interference and disruption,
    f. Additional guaranty and warranty durations,
    g. On-Site supervision, additional temporary protection,
    h. Additional temporary utilities,
    i. Additional material handling costs,
    j. Additional safety equipment costs.

H. Contractor's Certification:
1. All proposed change order requests, including those originated by the Contractor or those filed as claims, must include the following certification by the Contractor:

> "The undersigned Contractor approves the foregoing as to the changes in work, if any, and as to the contract price specified for each item and as to the extension of time allowed, if any, for completion of the project as stated herein, and agrees to furnish all labor, materials, and service and to perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of claims which have no basis in fact or which Contractor knows are false are made at the sole risk of the Contractor and may be a violation of the False Claims Act, as set forth in Government Code Sections 12650 et seq. It is understood that the changes to the Contract Documents set forth herein shall only be effective upon approval by the governing board of the District.

"It is expressly understood that the value of the extra work or changes expressly includes any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the project or resulting from delay to the project. Any costs, expenses, damages, or time extensions not included herein are deemed waived."

2. All proposed change orders requests shall be submitted on forms included in this project manual. Change Order Requests submitted on the Contractor's forms, altered, modified, or incomplete forms will be deemed waived.

I. Format for Change Order Request: The following format shall be prepared by the Contractor to communicate proposed additions and deductions to the Contract.

CHANGE ORDER REQUEST NO.____

	ADDED	CREDIT
GENERAL CONTRACTOR'S WORK		
1. Material (attach itemized quantity and unit cost excluding sales tax)	_____	_____
2. Labor (attach itemized hours and rates)	_____	_____
3. Equipment (attach invoices)	_____	_____
4. Subtotal	_____	_____
5. General Contractor's Overhead and Profit, not to exceed fifteen percent (15%) of line 4.	_____	_____
6. Subtotal	_____	_____
7. Liability and Property Damage Insurance, Worker's Compensation Insurance, Social Security, and Unemployment Taxes, not to exceed thirty-three percent (33%) of line 2.	_____	_____
8. Subtotal General Contractor Work (sum of lines 6 and 7.)	_____	_____
SUBCONTRACT WORK (Provide separate breakdown for each subcontract)		
9. Material (attach itemized quantity and unit cost excluding sales tax)	_____	_____
10. Labor (attach itemized hours and rates)	_____	_____
11. Equipment (attach invoices)	_____	_____
12. Subtotal	_____	_____
13. Subcontractor's overhead and profit on work performed by Sub-contractor, not to exceed fifteen percent (15%) of line 12.	_____	_____
14. Subtotal	_____	_____
15. General Contractor's Overhead and Profit on subcontract work, not to exceed ten percent (10%) of line 14.	_____	_____
16. Liability and Property Damage Insurance, Worker's Compensation Insurance, Social Security, and Unemployment Taxes, not to exceed thirty-three percent (33%) of line 10.	_____	_____
17. Total of Subcontract Work (sum of lines 14, 15 and 16)	_____	_____
18. Subtotal General Contractor and Subcontractor Work (sum of lines 8 and 17.)	_____	_____
19. Applicable Taxes (itemized by levy and by contract)	_____	_____
20. Subtotal (sum of lines 18 and 19)	_____	_____
21. Bond not to exceed one and one half percent (1 1/2%) of line 20.	_____	_____
22. TOTAL (sum of lines 20 and 21.)	_____	_____

J. The value of such extra work or changes, as determined by any of the aforementioned methods, expressly includes any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the project or resulting from delay to the project. Any costs or expenses not included in the COR are deemed waived.

K. Changes may be made by Owner by an appropriate written Change Order, or, at the Owner's option, such changes shall be implemented immediately upon the Contractor's receipt of an appropriate written directive.

L. Notice required for Contractor-Initiated Change Order Requests: To request an increase in the Contract Price, or any extension in the Contract Time for completion, Contractor shall give the Owner and the Architect written notice thereof within ten (10) days after the occurrence of the event giving rise to the request, together with detailed estimates of the impact on the Contract Price and/or the Contract Time.
   1. This notice shall be given by the Contractor before proceeding to execute the Work.
   2. No request shall be considered unless made in accordance with this Article; however, the mere presentation of such claim shall not establish the validity of the cause giving rise to such request, or of the extension of the Contract Time, and/or the increase in the Contract Price.
   3. Contractor shall proceed to execute the Work even though the adjustment has been rejected or not agreed upon.
   4. Failure to provide the required notice within the stated time constitutes an express waiver of request.
   5. Any change in the Contract Price or extension of the Contract Time resulting from such request shall be authorized by a Change Order.

1.09 CHANGE ORDERS ("CO")

A. No Changes Without Authorization;
   1. There shall be no change whatsoever in the drawings, specifications, or in the Work without an executed Change Order or an order by the Architect for a minor change in the Work as herein provided.
   2. Owner shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the same shall have been authorized by and the cost thereof approved in writing by Change Order.
   3. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted in writing in the Change Order.
   4. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications.
   5. Notwithstanding anything to the contrary in this Article, all Change Orders shall be prepared and issued by the Architect and shall become effective when executed by the Owner, the Architect, the Contractor, and associated Construction Change Document (CCD) approved by DSA.

B. Owner will designate in writing the person who is authorized to execute change orders.

C. Contractor may initiate changes by submitting a written notice to Architect containing:
   1. Description of the proposed changes.
   2. Statement of the reason for making the changes.

3. Statement of the effect on the contract sum and the contract time.
4. Statement of the effect on the work of separate contractors.
5. Documentation supporting any change in contract sum or contract time as appropriate.

D. A Change Order is a written instrument prepared by the Architect and signed by the Owner, the Contractor, and the Architect stating their agreement upon all of the following:
   1. a change in the Work;
   2. the amount of the adjustment in the Contract Sum, if any; and
   3. the extent of the adjustment in the Contract Time, if any.

E. The following paragraph shall be a part of each Change Order:
   1. The compensation (time and cost) set forth in this Change Order comprises the total compensation due the Contractor, all Subcontractors and all Suppliers, at all tiers, for the work or change defined in the Change Order, including all impact on unchanged work. By signing this Change Order the Contractor acknowledges and agrees, on behalf of themselves, all Subcontractors and all Suppliers, at all tiers, that the stipulated compensation includes payment for all work contained in the Change Order, plus all payment for the interruption of schedules, extended and unabsorbed overhead costs, delay, disruption, and all impact, ripple impact or cumulative impact on all other work under this Contract. The signing of the Change Order indicates that the Change Order constitutes full mutual accord and satisfaction for the changed work, and that the time and cost under the Change Order constitutes the total equitable adjustment owed the Contractor, all Subcontractors and all Suppliers, at all tiers, as a result of the change. The Contractor, on behalf of themselves, all Subcontractors and all Suppliers, at all tiers, agrees to waive all rights, without exception or reservation of any kind whatsoever to file any further claim related to this Change Order. No further claim or request for equitable adjustment of any kind whatsoever shall arise out of or as a result of this change or the impact of this change on the remainder of the work under this Contract.

F. For a "close out" Change Order (i.e., the final Change Order on the project), add the following paragraph.
   1. By execution of this Change Order the Contractor specifically waives, relinquishes, and releases any and all rights under Section 1542 of the California Civil Code which reads as follows:

      "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

1.10 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

B. Transmittal and Distribution:
   1. Architect will prepare and execute the Change Order and forward to Contractor.
   2. Contractor shall execute the Change Order and forward to Architect. Architect will forward Change Order to Owner.
   3. Owner will execute the Change Order and forward to the Architect.

1.11 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price.

B. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 ELECTRONIC PROCESSING PROCEDURES

A. Modification requests shall be transmitted to the Architect using the project's cloud-based file sharing and storage service ("project's website") with electronic, editable (PDF) format attachments, as required. The cloud-based file sharing and storage service will be selected by the Architect.

B. Contractor's cost related to use of the project's website services shall be included in the Contractor's bid.

C. Provide hardcopy submittals if requested by Architect.

D. The Architect's review comments and/or direction will be made available on the project's website for downloading.

E. Contractor will distribute a hardcopy of all reviewed request and direction to the Inspector of Record, Owner, and Construction Manager.

END OF SECTION

(MODIFICATION PROCEDURE FORMS FOLLOW)

REQUEST FOR INFORMATION
ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS
REQUEST FOR PROPOSAL
POTENTIAL CHANGE ORDER
CHANGE ORDER

-O-1.4

QUATTROCCHI KWOK
ARCHITECTS

Request for Information

Detailed, RFIs without Routing Information Grouped by RFI Number

Project Number:
DSA Application:
DSA File:

Date Created:

Answer Company	Answered By	Author Company	Authored By
Quattrocchi Kwok Architects 636 5th Street Santa Rosa, CA 95404			

Co-Respondent	Author RFI Number

Subject	Discipline	Category

Cost Impact	Amount	Schedule Impact	Days	Drawing Impact
			0	

Cost Impact Comments	Schedule Impact Comments	Drawing Impact Comments

Drawing/Specification Section Reference:

Question — **Date Required:**

Suggestion

Answer — **Date Answered:**

-O-1.5

QUATTROCCHI KWOK
ARCHITECTS

Architect's Supplemental Instruction

Detailed, Grouped by Each Number

Project Number:
DSA Application:
DSA File:

Number: **Date:**

To: **From:** Quattrocchi Kwok Architects

636 5th Street
Santa Rosa, CA 95404

Subject

Reference Drawing/Detail **Attachments**

Description

QUATTROCCHI KWOK ARCHITECTS

-O-1.6

Request for Proposal

Project Number:
DSA Application:
DSA File:

RFP __

Please submit an itemized proposal for changes in the Contract Sum or Contract Time for proposed modifications to the Contract Documents described herein. Submit proposal within ten (10) days or notify the Architect in writing of the date on which you anticipate submitting your proposal. Proposal shall include all impacts related to this change and contractor is due no further completion than represented by proposal for change or any impacts related to change.

THIS IS NOT A CHANGE ORDER OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

Please provide itemized pricing for the following description of work:

Attachments:

QUATTROCCHI KWOK ARCHITECTS

Potential Change Orders

Detailed, Grouped by Each Number

Project Number:
DSA Application:
DSA File:

PCO Number:	Title:		Status:
Date Created	Reference		

Full Description

Schedule Adjustment

Requested Days	Approved Days

Price Adjustment

Proposed Amount	Approved Amount	Applied Amount

PROJECT:

Project No.: _____
Date: _____
DSA App. No.: _____
Page _____
of _____

Line	TITLE:	ADDED	CREDIT
	ALL LINES SHALL BE FILLED IN, (zero values acceptable).		
	GENERAL CONTRACTOR'S WORK		
1	Material (attach itemized quantity and unit cost excluding sales tax)		
2	Labor (attach itemized hours and rates)		
3	Equipment (attach invoices)		
4	**Subtotal**		
5	General Contractor's Overhead and Profit, not to exceed fifteen percent (15%) of line 4.		
6	**Subtotal**		
7	Liability and Property Damage Insurance, Worker's Compensation Insurance, Social Security, and Unemployment Taxes, not to exceed thirty-three percent (33%) of line 2.		
8	**Subtotal** General Contractor Work (sum of lines 6 and 7.)		
	SUBCONTRACT WORK (Provide separate breakdown for each subcontract)*		
9	Material (attach itemized quantity and unit cost excluding sales tax)		
10	Labor (attach itemized hours and rates)		
11	Equipment (attach invoices)		
12	**Subtotal**		
13	Subcontractor's overhead and profit on work performed by Sub-contractor, not to exceed fifteen percent (15%) of line 12.		
14	**Subtotal**		
15	General Contractor's Overhead and Profit on subcontract work, not to exceed ten percent (10%) of line 14.		
16	Liability and Property Damage Insurance, Worker's Compensation Insurance, Social Security, and Unemployment Taxes, not to exceed thirty-three percent (33%) of line 10.		
17	**Total** of Subcontract Work (sum of lines 14, 15 and 16)		
18	**Subtotal** General Contractor and Subcontractor Work (sum of lines 8 and 17.)		
19	Applicable Taxes (itemized by levy and by contract)		
20	**Subtotal** (sum of lines 18 and 19)		
21	Bond not to exceed one and one half (1 1/2%) of line 20.		
22	**TOTAL** (sum of lines 20 and 21.) Copy to cover page.		

* Attach additional copies of this page as required to summarize additional subcontracts.

CHANGE ORDER

Distribution to

x	OWNER
x	ARCHITECT
x	CONTRACTOR
x	IOR
x	DSA

#REF!

CO 00

###

PROJECT

CONTRACTOR

Change Order No. Zero (00)

Project No.

Initiation Date:

Contract For:

Contract Date

DSA File No.

DSA App. No.

OPSC App. No.

You are directed to make the following changes in this contract: (Refer to Attached Summary)

Reserved for Architect's Stamp

Reserved for DSA Approval Stamp

The original Contract Sum was	
Net change by previousChange Orders	$ -
The Contract Sum prior to this Change Order was	$ -
The Contract Sum will be UNCHANGED by this Change Order in the amount of	$ -
The new Contract Sum including this Change Order will be	$ -
The Contract Time will be UNCHANGED by this Change Order in the amount of	0 Days
The Date of Completion as of the date of this Change Order:	1/0/1900

Not valid until signed by both the Owner and the Architect.

Signature of the contractor indicates his or her approval herewith, including any adjustment in the Contract Sum or Contract Time.

The compensation (time and cost) set forth in this Change Order comprises the total compensation due the Contractor, all Subcontractors and all Suppliers, at all tiers, for the work or change defined in the Change Order, including all impact on unchanged work. By signing this Change Order the Contractor acknowledges and agrees, on behalf of themselves, all Subcontractors and all Suppliers, at all tiers, that the stipulated compensation includes payment for all work contained in the Change Order, plus all payment for the interruption of schedules, extended and unabsorbed overhead costs, delay, disruption, and all impact, ripple impact or cumulative impact on all other work under this Contract. The signing of the Change Order indicates that the Change Order constitutes full mutual accord and satisfaction for the changed work, and that the time and cost under the Change Order constitutes the total equitable adjustment owed the Contractor, all Subcontractors and all Suppliers, at all tiers, as a result of the change. The Contractor, on behalf of themselves, all Subcontractors and all Suppliers, at all tiers, agrees to waive all rights, without exception or reservation of any kind whatsoever to file any further claim related to this Change Order. No further claim or request for equitable adjustment of any kind whatsoever shall arise out of or as a result of this change or the impact of this change on the remainder of the work under this Contract.

By execution of this Change Order the Contractor specifically waives, relinquishes, and releases any and all rights under Section 1542 of the California Civil Code which reads as follows:
"A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY EFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

ARCHITECT	*CONTRACTOR*	*OWNER*
QUATTROCCHI KWOK ARCHITECTS		
636 Fifth Street		
Santa Rosa, CA 95404		
By.	By.	By.
Date	Date	Date

SUMMARY OF ATTACHMENTS TO:
PROJECT

Change Order No. Zero (00)
Project No.
Contract For:
DSA App. No.

The Time for Milestone 1 will be UNCHANGED by this Change Order in the amount 0 Days
The Date of Milestone 1 as of the date of this Change Order therefore is 1/0/1900
The Time for Milestone 2 will be UNCHANGED by this Change Order in the amount 0 Days
The Date of Milestone 2 as of the date of this Change Order therefore is 1/0/1900
The Time for Milestone 3 will be UNCHANGED by this Change Order in the amount 0 Days
The Date of Milestone 3 as of the date of this Change Order therefore is 1/0/1900

					Calendar Days Added to Contract			
No.	Reference:	Description:	C.O.R. #	Amount	DoC	M1	M2	M3
			TOTALS:	$ -	0	0	0	0
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13								
14.								
15.								
16.								
17.								
18.								
19.								
20.								
21.								
22.								
23.								
24.								
25.								
26.								
27.								
28.								
29.								
30.								
31.								
32.								
33.								
34.								
35.								
36.								
37.								
38.								
39.								
40.								
41.								
42.								

END OF SUMMARY

SECTION 01 2900

APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. Payment Procedures:
   1. Schedule of Values.
   2. Applications for Payment.
   3. Conditions of Payment.
   4. Final Payment.
   5. Contractor Submittals.

B. Related Documents
   1. Document - Contract (Agreement Between Owner and Contractor): Lump Sum.
   2. Document - General Conditions: Progress Payments, Retainages and Final Payment, Applicability of Labor Compliance Program.
   3. District Labor Compliance Program, as applicable to the project.
   4. Section 01 2600 - Modification Procedures: Change Orders.
   5. Section 01 3900 - Coordination and Meetings.
   6. Section 01 3300 - Submittals: Submittal procedures.
   7. Section 01 3200 - Construction Progress Schedules.
   8. Section 01 7000 - Contract Closeout: Final payment.

1.02 SUBMITTALS

A. On forms approved by the Owner, the Contractor shall furnish the following:
   1. Within ten (10) days of the award of the Contract, a detailed breakdown of the Contract Price (Schedule of Values) for each Project or Site;
   2. Within ten (10) days of the award of the Contract, a schedule of estimated monthly payment requests (cash flow) due the Contractor showing the values and construction time of the various portions of the Work to be performed by it and by its Subcontractors or material and equipment suppliers containing such supporting evidence as to its correctness as the Owner may require;
   3. Within ten (10) days, the name, address, telephone number, fax number, license number, and classification of all of its Subcontractors and of all other parties furnishing labor, material, or equipment for its Contract, along with the amount of each such subcontract or the price of such labor, material, and equipment needed for its entire portion of the Work.
   4. Five (5) days prior to the submission of a pay request, an itemized breakdown of work done for the purpose of requesting partial payments;
   5. Five (5) days prior to the submission of a pay request, the minutes of Coordination Meetings per Section 01 3900.
   6. Five (5) days prior to the submission of a pay request, updated Construction Progress Schedule per Section 01 3100.

7. Five (5) days prior to the submission of a pay request, updated Construction Waste Management Plan with Delivery Receipts per Section 01 7419.
8. For all public works projects subject to prevailing wage requirements of the Labor Code: submittal of electronic certified payroll records to the State Labor Commissioner maintained on a weekly basis, as required (Labor Code Section 1776), and penalties for failure to do so (Labor Code Section 1776(g)); The requirement includes and applies to all subcontractors performing work on projects even if their portion of the work is less than one half of one percent of the total amount of the contract.

B. Owner Approval Required
   1. The Owner shall review all submissions received pursuant to paragraph 1.03 A. in a timely manner. All submissions must be approved by the Owner before becoming the basis of any payment.

C. Submit itemized applications typed on Application and Certificate for Payment and Continuation Sheet.

D. Provide itemized data on continuation sheet:
   1. Format, schedules, line items and values: Those of the Schedule of Values accepted by Architect.

E. Obtain signature of Owner's Inspector on Application for Payment Continuation Sheet with each application prior to submittal to Architect.

1.03 SCHEDULE OF VALUES

A. The Schedule of Values shall be used only as the basis for the Contractor's Progress Payments.

B. Upon request of the Architect, support the values with data which will substantiate their correctness.

C. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
   1. Contractor's construction schedule.
   2. Application for Payment form.
   3. List of subcontractors
   4. List of products.
   5. List of principal suppliers and fabricators.
   6. Schedule of submittals.

D. Form of Schedule: Submit schedule on Application for Payment Continuation Sheet. Identify schedule with;
   1. Title of Project and location, and name of Owner.
   2. Architect and Architect's Project Number.
   3. Name and address of Contractor.
   4. Contract designation.
   5. Date of submission.

E. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction. Modify detail as requested by Architect.

F. Follow the table of contents of this Project Manual as the form for listing component items.
   1. Identify each line item with the number and title of the respective section of the specifications.
   2. Include separate line items for each section of Division 01.

G. For each major line item which has installed value of more than $10,000.00, list sub-values of major products or operations under the item.

H. For the various portions of the Work:
   1. Itemize separate line item cost for each of following general cost items (if provided):
      a. Performance and payment bonds.
      b. Field supervision and layout.
      c. Temporary facilities and controls.
      d. Mobilization.
   2. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
   3. For items on which progress payments will be requested for stored materials, break down the value into:
      a. The cost of the materials, delivered and unloaded, with taxes paid.
      b. The total installed value.

I. The sum of all values listed in the schedule shall equal the total Contract Sum.

1.04 APPLICATIONS FOR PAYMENT

A. Procedure: On or before the twenty-fifth (25th) day of each calendar month during the progress of the portion of the Work for which payment is being requested, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be notarized if the project is subject to a Labor Compliance Program, or if directed by the Owner for projects not subject to as Labor Compliance Program, and supported by all of the following, or such portion thereof as Architect requires:
   1. The amount paid to the date of the Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;
   2. The amount being requested with the Application for Payment by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;
   3. The balance that will be due to each of such entities after said payment is made;
   4. A certification that the Record Drawings and Annotated Specifications are current;
   5. The additions to and subtractions from the Contract Price and Time;
   6. A summary of the retentions (each Application shall provide for retention, as set forth above, of the amount due until completion of the Work of the Contractor and Final Acceptance thereof by Owner);

7. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the Owner may require from time to time;
8. The percentage of completion of the Contractor's Work by line item; and
9. A statement showing all payments made by the Contractor for labor and materials on account of the Work covered in the preceding Application for Payment.

B. Application Form:
1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
3. Execute certification with signature of a responsible officer of Contract firm.

C. Continuation Sheets:
1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
3. List each Change Order executed prior to date of submission, at the end of the continuation sheets.
   a. List by Change Order Number, and description, as for an original component item of work.

D. Purchase of Materials and Equipment: The Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from Owner. Therefore, payment by the Owner for stored material shall be made only in unusual circumstances where the Architect specifically recommends, and Owner specifically approves, the payment in writing.
   Payments made on account of materials and equipment not incorporated in the Work shall be conditioned upon submission by the Contractor, Subcontractor, or vendor of:
   a. bills of sale and such other documents satisfactory to the Architect and the Owner to establish the Owner's title to such materials or equipment free of all liens and encumbrances, and otherwise protect the Owner's interest, and:
   b. including, without limitation, provision of applicable insurance and transportation to the Site.
2. All stored items shall be inventoried, specified by identification numbers (if applicable), released to the Owner by sureties of the Contractor and the Subcontractor and delivered and suitably stored at the Site or at some other location agreed upon in writing by the Owner, if stored off-Site, stored only in a bonded warehouse.

E. Warranty of Title: The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work.

F. Progress Payments:
   1. Payments to Contractor
      a. Within thirty (30) days after approval of the Request for Payment, Contractor shall be paid a sum equal to ninety five (95) percent of the value of the Work performed up to the last day of the previous month unless a different retention percentage is stated in the Notice Inviting Bids, in which case that percentage applies, less the aggregate of previous payments. The value of the Work completed shall be an estimate only, no inaccuracy or error in said estimate shall operate to release the Contractor, or any bondsman, from damages arising from such Work or from enforcing each and every provision of this Contract, and the Owner shall have the right subsequently to correct any error made in any estimate for payment.
      b. The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for work performed, so long as any lawful or proper direction given by the Owner concerning the Work, or any portion thereof, remains uncomplied with. At any time after fifty percent (50%) of the Work has been completed, if the Owner, by action of its governing body, finds that satisfactory progress is being made, the Owner may make any of the remaining payments in full for actual work completed or may withhold any amount up to ten percent (10%) thereof as the Owner may find appropriate based on the Contractor's progress.

   2. Payments to Subcontractors: No later than ten (10) days after receipt, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.
   3. Percentage of Completion or Payment Information: The Owner will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor, and action taken thereon by the Owner, on account of portions of the Work done by such Subcontractor.
   4. No Obligation of Owner for Subcontractor Payment: The Owner shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.
   5. Payment to Suppliers: Payment to material or equipment suppliers shall be treated in a manner similar to that provided in paragraphs 1.05 F. 2., 3. and 4.
   6. Payment Not Constituting Approval or Acceptance: An approved Request for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of work not in accordance with the Contract Documents.
   7. Joint Checks: Owner shall have the right, if necessary for the protection of the Owner, to issue joint checks made payable to the Contractor and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint check payment be construed to create any contract between the Owner and a Subcontractor of any tier, any obligation from the Owner to such Subcontractor, or rights in such Subcontractor against the Owner.

G. Labor Compliance: A determination regarding whether this project is subject to prevailing wage requirements of the Labor Code is included in the Instructions to Bidders. Further information is contained in the General Conditions. The Contractor is responsible for enforcement of the terms and conditions of the Labor Code, including electronic certified payroll reporting and posting job site notices prescribed by regulation.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. Each and every Application for Payment shall be accompanied with the complete substantiating data specified in this Section in the article titled CONDITIONS OF PAYMENT.

B. When the Owner or the Architect requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:
   1. Project.
   2. Application number and date.
   3. Detailed list of enclosures.
   4. For stored products:
      a. Item number and identification as shown on application.
      b. Description of specific material.

1.06 COMPLETION AND FINAL PAYMENT

A. Final Inspection
   1. Contractor shall immediately upon receipt of the Punch List, initiate work on all items therein related to Contractor's Work and diligently complete the same. Upon receipt of Contractor's written notice that all of the Punch List items have been fully completed and the Work is ready for final inspection and acceptance, Architect shall inspect the Work and shall submit to Contractor and Owner a final inspection report noting the work, if any, required in order to complete the Work in accordance with the Contract Documents. Absent unusual circumstances, this report shall consist of the Punch List items not yet satisfactorily completed.
   2. Upon completion of the Work contained in the final inspection report, the Contractor shall so notify the Owner, who shall again inspect such Work. If the Owner finds the Work contained in such final inspection report acceptable under the Contract Documents and, therefore, the Work fully completed, it shall so notify Contractor, who shall then submit to the Architect its final Application for Payment.
   3. Upon receipt and approval of such final Application for Payment, the Architect shall issue a final Certificate of Payment stating that to the best of its knowledge, information, and belief, and on the basis of its observations, inspections, and all other data accumulated or received by the Architect in connection with the Work, such Work has been completed in accordance with the Contract Documents. The Owner shall thereupon inspect such Work and either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon acceptance of the Work of the Contractor as fully complete (which, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the Owner shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of payment from Owner, pay the amounts due Subcontractors.

B. Retainage: The retainage, less any amounts disputed by the Owner or which the Owner has the right to withhold, shall be paid after approval of the Owner of the Architect's Certificate of Payment referred to in paragraph 1.07 A., after the satisfaction of the conditions set forth in paragraph 1.07 C., and after thirty-five (35) days after the acceptance of the Work and recording of the Notice of Completion by Owner. No interest shall be paid on any retainage, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents.

C. Procedures for Application for Final Payment: The Application for Final Payment shall be accompanied by the same details as set forth in paragraph 1.05, and in addition, the following conditions must be fulfilled:
   1. A full and final waiver of all liens in connection with the Work shall be submitted by Contractor, including a release of lien in recordable form, together with (to the extent permitted by law) a copy of the full and final waiver of all liens, including a release of lien in recordable form, in connection with the Work obtained by Contractor from each person to receive a payment thereunder, which waivers of lien shall be in a form as approved by Owner.
   2. The Contractor shall have made, or caused to have been made, all corrections to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of Owner required under the Contract.
   3. Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work.
   4. The Contractor shall deliver to the Owner reproducible final Record Drawings and Annotated Specifications showing the Contractor's Work "as built," with the Contractor's certification of the accuracy of the Record Drawings and Annotated Specifications, all guarantees, and operation and maintenance instructions for equipment and apparatus.
   5. Architect shall have issued a Final Certificate of Payment.
   6. The Contractor shall have delivered to the Owner all manuals and materials required by the Contract Documents.
   7. The Contractor shall have removed, or caused to be removed, all waste materials and rubbish from and about the Site, as well as all tools, construction equipment, machinery, surplus material, scaffolding equipment, and any other similar materials of the Contractor or any subcontractor, shall have cleaned, or caused to be cleaned, all glass surfaces, and shall have left the Work broom-clean, except as otherwise provided in the Contract Documents.

D. Fill in Application form as specified for progress payments and present the final statement of accounting.

E. Use continuation sheet for presenting the final statement of accounting as specified in Section 01 7000 - Contract Closeout.

F. Fill out and submit with application for final payment:
   1. Contractor's Affidavit of Payment of Debts and Claims.
   2. Contractor's Affidavit of Release of Liens.

3. Consent of Surety Company to Final Payment.
4. Release Form 3 Conditional Waiver and Release Upon Final Payment.

G. Fill out and submit to Owner prior to receipt of final payment: Release Form 4 Unconditional Waiver and Release Upon Final Payment

1.07 SUBMITTAL PROCEDURE

A. Submit Applications for Payment to Architect at the times stipulated in the Agreement.

B. Number: Five copies of each Application, or four copies in addition to number required by Contractor.

C. Each Application shall include all of the items listed in the Article titled CONDITIONS OF PAYMENT.

1.08 CONDITIONS OF PAYMENT

A. Contractor submittal of the following items attached to the Application for Payment Transmittal following this Section with original signature of the Contractor's Project Superintendent, with each and every Application for Payment is a condition precedent to receipt of payment.
   1. Certification of Review of Payment Application by original signature on the Application for Payment Transmittal of Contractor's Superintendent. This document shall be counter-signed signifying review and approval by Owner's Inspector of Record.
   2. Application for Payment with schedule of values for the period during which Work was performed.
   3. Completed Daily Reports for the applicable billing period. Contractors shall maintain daily records of their activities, subcontractors present, number of workers representing each subcontractor, number of workers employed by the Contractor, and any other information deemed pertinent by the Contractor. Architect is not required to review or comment on this information.
   4. Completed Schedule Update for the applicable billing period, with all attachments as may be required by Section 01 3100 for that submittal.
   5. Provide Certification by original notarized signature of Contractor's Project Superintendent on the Application for Payment Transmittal that the project is on schedule and that the Contractor has experienced no delays or schedule disruptions.
      a. In the event that a Contractor has experienced delay or disruption in the period for which payment is applied, Contractor must so indicate in writing with original signature on Contractor's company letterhead attached to this certification stating the nature of the delay or disruption, the event that precipitated said delay, and the method of recovering the lost time and maintaining the schedule recommended by the Contractor. Failure to so timely indicate delay or disruption shall be construed as a waiver of claim for damages for same.
   6. Certification by original notarized signature of Contractor's Project Superintendent on the Application for Payment Transmittal that Contractor has updated all As-Built Drawings in the Project Superintendent's office.

7. Completed Conditional Waiver and Release Upon Progress Payment Forms for the Contractor and any and all Subcontractors, second and third tier subcontractors and material suppliers or service providers.
8. Completed Unconditional Waiver and Release Upon Progress Payment Forms for previous billing period, if any. Contractor to provide one Unconditional Waiver and Release Upon Progress Payment for every corresponding Conditional Waiver and Release submitted with previous Application for Payment.
9. Copy of Verified Report Form SSS 6, as required during the applicable billing period.

B. When Architect finds Application and all required submittal attachments properly completed and correct, he or she will transmit Certificate for Payment to Owner, with copy to Contractor. Incomplete or improper submittals will be returned to the Contractor without action.

1.09 REVIEW OF PROGRESS PAYMENT

A. Owner Approval: The Architect will, within seven (7) days after receipt of the Contractor's Application for Payment, either certify such payment or notify the Contractor in writing of the Architect's reasons for withholding certification in whole or in part as provided above.

B. Architect's Review: The review of the Contractor's Application for Payment by the Architect is based on the Architect's observations at the Site and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the review by the Architect will not be a representation that the Architect has:
1. Made exhaustive or continuous on-Site inspections to check the quality or quantity of the Work;
2. Reviewed construction means, methods, techniques, sequences, or procedures;
3. Reviewed copies of requisitions received from Subcontractors, material and equipment suppliers, and other data requested by the Owner to substantiate the Contractor's right to payment; or
4. Made on examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.
5. Reviewed or examined for accuracy or completeness any documentation submitted to comply with the Owner's Labor Compliance Program.

1.10 DECISIONS TO WITHHOLD PAYMENT

A. Reasons to Withhold Payment: The Owner may decide to withhold payment in whole, or in part, to the extent reasonably necessary to protect the Owner if, in the Owner's opinion, the representations to the Owner required by the Article titled REVIEW OF PROGRESS PAYMENT cannot be made. The Owner may withhold payment, in whole, or in part, to such extent as may be necessary to protect the Owner from loss because of:

1. Defective Work not remedied;
2. Stop Notices filed, unless the Contractor at its sole expense provides a bond or other security satisfactory to the Owner in the amount of at least one hundred twenty-five percent (125%) of the claim, in a form satisfactory to the Owner, which protects the Owner against such claims;
3. Liquidated damages assessed against the Contractor;
4. Reasonable doubt that the Work can be completed for the unpaid balance of any Contract Price or by the completion date;
5. Damage to the Owner, another contractor, or subcontractor;
6. Unsatisfactory prosecution of the Work by the Contractor;
7. Failure to store and properly secure materials;
8. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, monthly progress schedules, shop drawings, submittal schedules, schedule of values, product data and samples, proposed product lists, executed change orders, and verified reports, certifications, certified payrolls , any submittals required by the Labor Compliance Program but not enumerated in this or other sections of these specifications, as applicable, and other submittals specified as conditions precedent to receipt of payment in the Article titled CONDITIONS OF PAYMENT;
9. Failure of the Contractor to maintain record drawings;
10. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment;
11. Unauthorized deviations from the Contract Documents; or
12. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and completion dates.
13. Failure of the Contractor to conform to the requirements of the Labor Compliance Plan as applicable.

B. Written Reasons for Withholding Provided: Upon request of the Contractor whose payment is deferred, the Contractor shall be given a written copy of Owner's reasons for withholding payment.

C. Payment After Cure: When the grounds for declining approval are removed, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

D. Labor Compliance Penalties: In addition to the remedy of withholding payment, the Owner may assess penalties as described in the Labor Compliance Program or as otherwise required by law for failure of the Contractor to conform to the requirements of the Labor Compliance Plan.

1.11 SUBSTITUTION OF SECURITIES

A. In accordance with § 22300 of the Public Contract Code, the Owner will permit the substitution of securities for any monies withheld by the Owner to ensure performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the Owner, or with a state or federally chartered bank as the escrow agent, who shall then pay such monies to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

B. Securities eligible for investment under this section shall include those listed in Government Code § 16430, bank or savings and loan certificates of deposit, interest-bearing, demand-deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Owner.

C. The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

D. The escrow agreement used for the purposes of this Section shall be substantially similar to the form set forth in Public Contract Code § 22300.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

(APPLICATION FOR PAYMENT FORMS FOLLOW)
APPLICATION FOR PAYMENT TRANSMITTAL
APPLICATION AND CERTIFICATE FOR PAYMENT
APPLICATION FOR PAYMENT CONTINUATION SHEET
CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS
CONTRACTOR'S AFFFIDAVIT OF RELEASE OF LEINS
CONSENT OF SURETY TO FINAL PAYMENT
RELEASE FORMS 1 THROUGH 4

WHEN NOTED IN THE GENERAL CONDITIONS AS PART OF THE PROJECT,
DISTRICT LABOR COMPLIANCE PROGRAM WILL BE
BOUND FOLLOWING THIS SECTION

RELEASE FORM 1

CONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT

(Civil Code Sec. 8132)

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Identifying Information

Name of Claimant: .....

Name of Customer: .....

Job Location: .....

Owner: .....

Through Date: .....

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: .....

Amount of Check: $ .....

Check Payable to: .....

Exceptions

This document does not affect any of the following:

(1) Retentions.

(2) Extras for which the claimant has not received payment.

(3) The following progress payments for which the claimant has previously given a conditional waiver and release but has not received payment:

Date(s) of waiver and release: .....

Amount(s) of unpaid progress payment(s): $ .....

(4) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Signature

Claimant's Signature: .....

Claimant's Title: .....

Date of Signature: .....

RELEASE FORM 2

UNCONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT

(Civil Code Sec. 8134)

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant: .....

Name of Customer: .....

Job Location: .....

Owner: .....

Through Date: .....

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has received the following progress payment:

$ .....

Exceptions

This document does not affect any of the following:

(1) Retentions.

(2) Extras for which the claimant has not received payment.

(3) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Signature

Claimant's Signature: .....

Claimant's Title: .....

Date of Signature: .....

RELEASE FORM.3

CONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT
(Civil Code Sec. 8136)

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Identifying Information

Name of Claimant: .....

Name of Customer: .....

Job Location: .....

Owner: .....

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: .....

Amount of Check: $ .....

Check Payable to: .....

Exceptions

This document does not affect any of the following:

Disputed claims for extras in the amount of: $ .....

Signature

Claimant's Signature: .....

Claimant's Title: .....

Date of Signature: .....

RELEASE FORM 4

UNCONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT

(Civil Code Sec. 8138)

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant: .....

Name of Customer: .....

Job Location: .....

Owner: .....

Through Date: .....

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for all labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has been paid in full.

Exceptions

This document does not affect the following:

Disputed claims for extras in the amount of: $ .....

Signature

Claimant's Signature: .....

Claimant's Title: .....

Date of Signature: .....

APPLICATION FOR PAYMENT TRANSMITTAL

Distribution to:

x	OWNER
x	ARCHITECT
	CONTRACTOR
x	INSPECTOR

Distribution By:

x	FAX
x	MAIL
	OVERNIGHT
	HAND DELIVERY

_____ - O - 1.11

A4P

P:\ProjectNo.ProjectName\Files\O-CA\11-A4P\LCPv2.0\4/2003

PROJECT:	ARCHITECT:		
0	**Quattrocchi Kwok Architects**	Application No.	
0	636 Fifth Street	Date:	
0	Santa Rosa, CA 95404	Arch. Project No.:	0
0	Fax 707-576-0295	Contract For:	Increment 1
		Contract Date:	1/0/1900
		DSA File No.:	0.00
OWNER:	**Inspector of Record**	DSA App. No.:	0
0	**0**	OPSC App. No.:	0
0	0	Contr. Project No.:	
0	0		
Fax: 0	Fax 0 Phone: 0		

The following documents are attached to this transmittal, in accordance with Section 01027 - Applications for Payment. This certification must accompany each Application for Payment.

		Completed (signed)
1	Application for Payment and Schedule of Values (AIA Forms G702 and G703)	
2	Contractor's Certified Payroll Report for billing period electronically submitted to DIR.	
3	Contractor's Complete Daily Logs for billing period noted.	
4	Completed Schedule update for the billing period noted.	
5	Complete Conditional Waiver and and Release upon Progress Payment form.	
6	Complete Unconditional Waiver and Release upon Progress Payment Form for month preceding.	
7	Original signature copies of DSA SSS-6 Verified Report Form (required for Release of Final Payment).	

INSPECTOR:

The undersigned has reviewed the attached Application for Payment and finds it representative of the work completed and material stored at the site. I recommend that the Architect certify and the District process payment to the Contractor as noted on the Application for Payment.
All the above prerequisites for Progress Payment have been met by the Contractor.

0
0
0

By. _____
original signature required

Date:

CONTRACTOR:

The undersigned certifies under penalty of perjury that the attached submittals are complete and correct; that the project is on schedule and has experienced no delays or disruption through the date of this transmittal except as shown on the attached Project Schedule of same date; and the Record drawings have been maintained and updated in accordance with the Contract Documents through the period as shown on the attached Application for Payment.

0
0
0

By. _____
original signature required

Date:

State of:
County of:
Subscribed and sworn to
before me this _____ day of _____
Notary Public:
My Commission expires:_____ Notary Stamp Above
Notary stamp required for projects with Labor Compliance Program

NOTE: All required original signatures must be affixed before processing of Application by the Architect.
Incomplete applications may be returned without action.

Application and Certificate for Payment

TO OWNER:	PROJECT:	APPLICATION NO.:	DISTRIBUTION TO:
		PERIOD TO:	Owner ☐
		CONTRACT FOR:	Architect ☐
FOR CONTRACTOR:	VIA ARCHITECT:	CONTRACT DATE:	Contractor ☐
		PROJECT NOS.:	Field ☐
			Other ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet is attatched.

1. **ORIGINAL CONTRACT SUM** ..... $_____
2. **NET CHANGE BY CHANGE ORDERS** ..... $_____
3. **CONTRACT SUM TO DATE** (line 1 ± 2) ..... $_____
4. **TOTAL COMPLETED & STORED TO DATE** *(column G)* ..... $_____
5. **RETAINAGE:**
   a. ____% of Completed Work
      (Columns D & E) $_____
   b. _____% of Stored Material
      (Column F) $_____
   Total Retainage *(Lines 5a + 5b)*
6. **TOTAL EARNED LESS RETAINAGE** ..... $_____
   (Line 4 minus Line 5 Total)
7. **LESS PREVIOUS CERTIFICATES FOR PAYMENTS** ..... $_____
   (Line 6 fron prior Certificate)
8. **CURRRENT PAYMENT DUE** ..... $
9. **BALANCE TO FINISH, INCLUDING RETAINAGE**
   (Line 3 minus Line 6) $_____

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this month	$	$
TOTAL	$	$
NET CHANGES by Change Order	$	

The undersigned Contractor certifies and declares under penalty of perjury under the laws of the state of California that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for work for which previous Certificates for Payment were issued and payments recieved from the Owner, and that current payment shown herin is due.

CONTRACTOR:

By: _____ Date: _____

State of:
County of:

Subscribed and sworn to before me this _____ day of _____

Notary Public:
My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $ _____

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contactor named herein, Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract

Continuation Sheet

Application and Certificate for Payment, or Application for Payment, Construction Manager as Advisor Edition, containing Contractor's signed certification is attatched. In tabulation below, amounts are in US dollars. Use Column I on Contracts where variable retainage for items may apply.

APPLICATION NO:

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
			WORK COMPLETED						
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	FROM PREVIOUS APPLICATION (D+E)	THIS PERIOD	MATERIALS PRESENTLY STORED *(Not in D or E)*	TOTAL COMPLETED AND STORED TO DATE *(D+E+F)*	% *(G/C)*	BALANCE TO FINISH *(C – G)*	RETAINAGE *(If variable rate)*
	GRAND TOTAL								

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR:

OWNER ☐
ARCHITECT ☐
CONTRACTOR ☐
SURETY ☐
OTHER ☐

TO OWNER: *(Name and address)*

CONTRACT DATED:

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1 Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. Consent of Surety, may be used for this purpose.

Indicate Attachment ☐ Yes ☐ No

The following supporting documents should be attatched hereto if required by the owner.

1 Contractor's Release or Waiver of Leins, conditional upon receipt of final payment.

2 Separate Releases of Waivers of Leins from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

3 Contractor's Affidavit of Release of Leins

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

Contractor's Affidavit of Release of Leins

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR:

OWNER ☐
ARCHITECT ☐
CONTRACTOR ☐
SURETY ☐
OTHER ☐

TO OWNER: *(Name and address)*

CONTRACT DATED:

STATE OF:

COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lein attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have leins or encumbrance or the right to assert liens or encumbrances against any property of the Owner arising in any number out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1 Contractor's Release or Waiver of Leins, conditional upon receipt of final payment.

2 Separate Releases or Waivers of Leins from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

_____

(Signature of authorized representative)

_____

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

Consent of Surety to Final Payment

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR:

CONTRACT DATED:

OWNER ☐
ARCHITECT ☐
CONTRACTOR ☐
SURETY ☐
OTHER ☐

TO OWNER: *(Name and address)*

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that the final payment to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

Attest
(Seal):

(Printed name and title)

SECTION 01 3200

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prepare cost loaded Construction schedule using the critical path method (CPM) demonstrating fulfillment of all contract requirements.

B. Submittals and Distribution.

C. Review.

D. Rain days.

E. Schedule of Milestones.

1.02 RELATED SECTIONS

A. Document 00 5200 – Contract: Contract Duration and provisions for liquidated damages.

B. Section 01 2900 - Applications For Payment: Schedule of values.

C. Section 01 4000- Quality Control: Inspection and testing reports.

1.03 DEFINITIONS

A. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations to determine when activities can be performed and the critical path of the Project.

B. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall project duration.

C. Network Diagram: A graphic diagram of a network schedule, showing the activities and activity relationships.

D. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical activities are activities on the critical path.
   2. Predecessor activity is an activity that must be completed before a given activity can be started.

E. Event: An event is the starting or ending point of an activity.

F. Milestone: A key or critical point in time for reference or measurement.

G. Float is the measure of leeway in activity performance.
   1. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
   2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.
   3. Float time shall accrue to the Owner and to the Owner's benefit.

1.04 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or Specialist Consultant to the Contractor specializing in CPM scheduling with three years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within forty-eight (48) hours of request.

B. Designate, in writing, an authorized representative who will be responsible for the preparation of the CPM schedule and progress of the project. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the Construction Schedule requirements.

C. Within 5 calendar days from Notice of Award, submit demonstration of competence in use of CPM scheduling, including evidence of the use of CPM scheduling as specified above. In the event of failure to satisfy Architect of competence, the Contractor shall be required to employ a qualified CPM consultant to be approved by the Architect.
   1. The cost of revision to the CPM schedule, not resulting from authorized contract changes, shall be the responsibility of the Contractor.

1.05 SCHEDULE OF INSPECTIONS AND TESTS

A. Provide information regarding tasks requiring special inspection and tests to District's inspection and testing laboratory, as requested.

1.06 CONSTRUCTION SCHEDULE

A. Prepare the Construction Schedule using the network analysis diagram system known as the critical path method (CPM). Follow procedures outlined in AGC's "Construction Planning & Scheduling".
   1. Proceed with preparation of the network diagram immediately following Notice of Award.
   2. Follow the steps necessary to complete development of the network diagram in sufficient time to submit the CPM Schedule so it can be accepted for use no later than 30 days after commencement of the Work.
   3. Conduct educational workshops to train and inform key project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule.
   4. Establish procedures for monitoring and updating the CPM Schedule and for reporting progress. Use "one working day" as the unit of time.

B. CPM Schedule Preparation: Prepare a list of all activities involved in the Project. Include a list of activities required to complete the Work. Provide the best data available for generation of the network diagram and the CPM Schedule.
   1. Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities.

2. Indicate estimated times for the following activities to be performed:
   a. Preparation and processing of submittals.
   b. Purchase of materials.
   c. Delivery.
   d. Fabrication.
   e. Installation.
3. Include, in the network diagram, separate activities showing:
   a. Preparation and submittal of shop drawings.
   b. Architect review of shop drawings, including review and selection of colors.
   c. Procurement and delivery of materials and equipment.
   d. Installation and testing of major equipment.
   e. Required delivery for all Owner supplied, Contractor installed items.
4. Include a legend showing:
   a. Each location or area code number and the place or location it refers to.
   b. Each responsibility or trade code number and the trade or entity it refers to.
5. Indicate each building or separate area as a separately scheduled element of the Work.
6. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
7. Where the work of several trades is combined into one activity, the Contractor shall furnish, for each such combined activity, the cost breakdown of each trade on sheets separate from the network diagram. The sum of the costs for each trade shall equal the total dollar value of each such combined activity.

C. Submit the following supporting data with the submittal of the original CPM construction schedule. Any changes to this information shall be submitted with successive updates and revisions.
   1. The proposed number of working days per week.
   2. The holidays to be observed during the duration of the contract (by day, month, and year).
   3. The planned number of shifts per day.
   4. The number of hours per shift.
   5. The planned usage of major construction equipment on the site, on a monthly basis.
   6. The average weekly manpower usage for each trade to be employed on the project.

D. Processing: Enter prepared data on the processing system. Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM Schedule within the limitations of Contract Time.

E. Format: Display the full network on a single sheet of stable transparency, or other reproducible media, of sufficient width to show data clearly for the entire construction period.
   1. Mark the critical path. Locate the critical path near the center of the network; locate paths with the most float near the edges.
   2. Sub networks on separate sheets are permissible for activities clearly off the critical path.

F. Initial Issue: Prepare the initial issue of the CPM Schedule network diagram from a listing of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports to show the following:
   1. The Contractor or subcontractor and Work or activity.
   2. Description of the activity.
   3. Principal events of that activity.

4. Immediate preceding and succeeding activities.
5. Early, late and actual start dates.
6. Early, late and actual finish dates.
7. Activity duration in working days.
8. Total float and free float time. Float time shall accrue to the Owner and to the Owner's benefit.
9. Average size of work force.
10. Monetary value of activity (coordinated with the Schedule of Values).

G. Value Summaries: Prepare 2 cumulative value listings, sorted by finish dates.
   1. In first listing, tabulate the following:
      a. Activity number.
      b. Early finish date.
      c. Dollar value.
      d. Cumulative dollar value.
   2. In second listing, tabulate the following:
      a. Activity number.
      b. Late finish date.
      c. Dollar value.
      d. Cumulative value.
   3. In subsequent issues of both listings, substitute actual finish dates for activities completed as of listing date.

H. Prepare listing for ease of comparison with payment requests: coordinate timing with progress meetings.
   1. In both value summary listings, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
   2. Submit value summary printouts following each regularly scheduled progress meeting.
   3. Provide monthly project cash flow analysis upon District's request at no additional cost.

1.07 REVISIONS TO SCHEDULES

A. Graphically indicate progress of each activity to date of submittal, and projected completion date of each activity as referenced to the baseline date for that activity as shown in the initial schedule.

B. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

C. Insert Delay Contingency activities into the critical path at the point where they occur, incorporating the mutually agreed duration per the Article on DELAY CONTINGENCY. Shorten the initial Delay Contingency activity by this mutually agreed duration.

C. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate contractors.

D. Revision to the CPM schedule may require reallocation of costs. Revised activity cost data shall be submitted with revised CPM schedules as necessary.

E. After each monthly update or revision, the Contractor shall submit, to the Architect, one complete set of reproducible transparencies of the last accepted CPM schedule, each marked up in red, showing all revisions and changes in accordance with the monthly review meeting.

F. Within five (5) working days after receipt of notice from the Architect, the Contractor shall submit a revised CPM schedule for any of the following reasons:
   1. When delay in completion of any activity, or group of activities, indicates an overrun of the contract time or milestone requirement by 20 working days or ten percent (10%) of the remaining duration, whichever is less.
   2. Delays in submittals or deliveries or work stoppage are encountered which make re-planning or rescheduling of the work necessary.
   3. The schedule does not represent the actual prosecution and progress of the project as being performed in the field.

1.08 SUBMITTALS

A. Submit initial schedules within fifteen (15) calendar days after date of Owner-Contractor Agreement. After review, resubmit required revised data within five days.

B. Submit revised Progress Schedules with each Application for Payment. Submittal of revised Progress Schedule is a condition precedent to receipt of Payment.

C. Submit the number of opaque reproductions which Contractor requires, plus three copies which will be retained by Architect. In addition, submit each schedule submittal, including initial submittal, in the Scheduling software's complete and original software file format on Compact Disc – Read Only (CD-ROM). Provide one such disk with each schedule submittal. Architect will retain CD-ROM electronic versions.

D. Submit "two-week look ahead" report in bar-chart format indicating activities scheduled to occur in the up-coming two week period. Provide and discuss these submittals at the progress meetings specified in Section 01 3900 and additionally as requested by the Architect, Owner or Inspector.

1.09 PROGRESS REPORTING, UPDATING AND REVISIONS:

A. On a date mutually agreed upon by the Architect and the Contractor, a job site progress meeting will be held each month at which time the CPM schedule will be reviewed and updated. Attendees of this meeting shall include the Architect, the General Contractor and subcontractors, if requested by the Architect. The Contractor shall have its copy of the Payment Request form and all other data required by the Contract Documents accurately filled in and completed prior to this meeting. Job Progress and the CPM schedule will be reviewed to verify:
   1. Payment due to the Contractor, based on percentage complete of items in the submitted Payment Request form.
   2. Logic, time and cost data for change order work that is to be incorporated into the CPM schedule or Payment Request form.
   3. Status of as-built record drawings and as-built record specifications.

B. The Contractor shall submit a narrative report as a part of its monthly progress review and update

1.10 REVIEW

A. Architect's review is limited to verification of compliance with the Contract start and end dates and inclusion of Contract Time adjustments.

B. To the extent that the CPM schedule or any revised CPM schedule shows anything not jointly agreed upon, it shall be deemed to have not been accepted by the Architect. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase notwithstanding the Architect's acceptance of the CPM schedule.

C. Acceptance of any revised CPM schedule and all supporting data is contingent upon compliance with all other paragraphs of this section and any other previous agreements or requirements with or by the Architect.

1.11 DELAY CONTINGENCY

A. Each Contractor submitting a bid proposal shall make allowance in its proposal and Project Schedule for sixty (60) work days for delay to the critical path due to inclement weather or delay due to circumstances beyond the Contractor's control.

B. Extension of time for delay due to inclement weather or circumstances beyond the Contractor's control will be allowed only in the event that the total number of critical path work days delayed exceeds the number of days allowed in paragraph A of this Article. No time extension will be allowed for delays that do not affect the critical path as set forth in the master schedule.

C. No time extension will be allowed for inclement weather occurring on any Saturday, Sunday, National or other holiday, including holidays recognized by specific unions, crafts or trades. Exception: If any day defined above is scheduled as a work day under the provisions of the Article CONTRACTOR'S RESPONSIBILITY FOR COMPLETION and approved by the Architect and Owner, or as otherwise approved by the Owner.

D. A rain day is defined as any day that receives .130" or greater rainfall as reported by a local weather service acceptable to the Architect and is cause for work to be stopped. For the purposes of this project, Rain Days must meet this definition and be mutually approved and agreed upon on the day that a rain day occurs by the Contractor and the Architect. Contractor will post and maintain, in a conspicuous location, a calendar of so-approved rain days at the Contractor's jobsite trailer.

1.12 CONTRACTOR'S RESPONSIBILITY FOR COMPLETION:

A. The Contractor agrees that whenever it becomes apparent from the monthly progress review meeting or the schedule that contract completion dates will not be met, it shall take some or all of the following action at no additional cost to the Owner:
   1. Increase construction manpower in such quantities and crafts as will bring the progress of the work into conformance with all other requirements of this section.
   2. Increase the number of working hours per shift, shifts per working day, workdays per week, the amount of construction equipment or any combination of the foregoing, to bring the scheduling and progress of the work into conformance with all requirements of the Contract Documents.

3. Reschedule the work under this contract in conformance with all other contract requirements to demonstrate completion of the contract work within the contract time.

B. Compensate owner for costs incurred to the Owner for rescheduling or additional testing, inspection, or architectural services made necessary by the Contractor's actions.

1.13 ADJUSTMENT OF THE CONTRACT TIME:

A. The contract time will be adjusted only for causes specified in the Contract Documents. In the event the Contractor requests an adjustment of the contract time, it shall furnish such justification, CPM data and supporting evidence as the Architect may deem necessary for a determination as to whether or not the Contractor is entitled to an adjustment of time under the provisions of the contract. Submission of proof based on revised activity logic, duration and cost is obligatory with any request. Requests not conforming to these requirements are deemed to be waived.

B. The Contract Time will be not be adjusted for any reason, including weather, until the latest accepted schedule clearly displays that the Contractor has used, in full, all the float time available for the Work. Delays in activities which, according to the latest accepted schedule, are not on the critical path in the CPM schedule will not be the basis for an adjustment to the contract time.

C. The Contractor shall submit each request for an adjustment in the contract time to the Architect in accordance with all other requirements of the Contract Documents. The Contractor shall include, as part of each request:
   1. Justification for the delay in narrative form.
   2. A sub network showing all CPM logic revisions, duration changes and cost changes for the work in question and its relationship to other activities on the CPM schedule.

D. The Architect's determination as to the adjustment of the contract time shall be based upon the latest schedule which has been accepted at the time of the alleged delay and all other relevant information. The Contractor shall submit with every request, an updated CPM schedule whenever the actual field progress of the work does not conform to the accepted schedule in force at the time of the alleged delay. The CPM data, if accepted by the Architect, shall be included in the next monthly updating of the schedule.

E. The Architect shall, within a reasonable time after receipt of a request and supporting evidence for extension of the contract time, review the facts and shall advise the Contractor, in writing, of its decision.

1.14 DISTRIBUTION

A. Distribute copies of reviewed schedules to Project site file, Subcontractors, suppliers, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

C. Architect will distribute copies to the Owner and the Inspector.

PART 2 PRODUCTS

2.01 SCHEDULING SYSTEMS

A. Prepare schedules using professional quality scheduling software systems designed for this purpose, capable of producing results specified.

B. Acceptable products:
   1. Primavera Systems
   2. Microsoft Project

PART 3 EXECUTION

3.01 MILESTONES

Refer to Schedule in Agreements

END OF SECTION

SECTION 01 3300

SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals required by the Contract Documents. Revise and re-submit as necessary to establish compliance with Contract Documents.
   1. It is reasonable that the Contractor will provide a satisfactory submittal by the second submittal. If repeated resubmittals are required, the Owner may "back charge" the Contractor for the cost of review and processing.

1.02 WORK NOT INCLUDED

A. Submittals which are not required will not be reviewed by the Architect.

B. The Contractor may require subcontractors to provide drawings, setting diagrams or similar information as part of the coordination of the Work. The Architect will not review this data.

1.03 RELATED WORK

A. Section 01 3100 - Construction Schedules: Dates for submission and dates that reviewed submittals will be required shall be designated in the Construction Schedule.

B. Section 01 7000 – Contract Closeout: Project record documents.

1.04 QUALITY ASSURANCE

A. Submit to the Architect for review, product literature, samples and shop drawings as specified or required to fully describe every item proposed for incorporation in the work. Only approved items may be used.

B. Prior to submittal, review and coordinate all aspects of each item. Verify that each item and it's submittals conform to Contract Document requirements. Contractor assumes full responsibility for coordinating and verifying information, quantities and dimensions shown in submittals.

C. Submittals shall include:
   1. Date and revision dates.
   2. Project title and number.
   3. The names of:
      a. Architect/Engineer.
      b. Contractor.
      c. Subcontractor.
      d. Supplier.
      e. Manufacturer.
      f. Separate detailer when pertinent.

4. Identification of product or material.
5. Relation to adjacent structure or materials.
6. Field dimensions, clearly identified as such.
7. Specification section number.
8. Applicable standards, such as ASTM number or Federal Specification.
9. A blank space, 8 inches x 3 inches, for the Contractor and Architect stamps.
10. Identification of deviations from Contract Documents.
11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.
12. Signature of and calculations by an engineer, licensed in California, where required by specifications.

D. Indicate review and approval of each submittal prior to transmittal to Architect by affixing Contractor's stamp, initialed or signed, certifying:
   1. Review of submittal
   2. Verification of compliance with requirements of the Contract Documents.
   3. Verification of compatibility with other submittals, shop drawings, substitutions, and work of other trades.
   4. Coordination with existing job conditions and field construction criteria.
   5. Field verification of dimensions.

E. Architect will review Contractor's stamp language. Revise language in accordance with Architect's comments and provide new stamp if required by Architect.

F. Architect will return unreviewed any submittal not stamped by the Contractor in accordance with the above.

G. Direct Architect's attention to any deviations from the Contract Documents . Deviations not so noted shall be considered unreviewed.

H. Direct Architect's attention to any changes made in submittals other than those specifically requested by Architect. Changes not so noted shall be considered unreviewed.

I. Work shall not be fabricated, nor material shipped to project site prior to the distribution of approved submittals from the Architect.

1.05 SUBMITTALS

A. Make submittals of shop drawings, product data, samples, substitution requests, meeting minutes and other items required by the Contract Documents in accordance with the provisions of this Section.

B. Submittals shall include all technical and performance data necessary for the Architect to properly evaluate the submittal. Provide physical samples if requested by Architect, whether expressly specified or not.

C. Incomplete submittals will be return to the Contractor without review. Contractor shall be responsible for delays incurred by incomplete, multiple reviews or rejected submittals.

D. Provide only one make or brand of any product proposed.

PART 2 PRODUCTS

2.01 SHOP DRAWINGS

A. Shop drawings are to be drawn at large scale, fully detailed and with all materials and stock or purchased components fully identified. Shop drawings are to be submitted when specified and to illustrate every custom fabricated item or assembly.

B. Types of prints required: See 3.01 ELECTRONIC SUBMITTAL PROCEDURES.

C. Drawings are to be identified showing the project name, the Owner's name and account number, the Architect's name and job number, the Contractor's name and the specification section number and drawing detail reference number relating to the work shown.

2.02 PRODUCT DATA

A. Submit detailed technical literature fully describing every product or item proposed for use including manufacturers and items specified. Include manufacturer's detailed specifications, drawings, photographs, performance criteria, installation instructions, test data, samples of colors and finishes and other information required to fully describe the item.
   1. Modify standard product data to delete information which is not pertinent.
   2. Provide additional information which is specifically applicable.

B. Mark all submittals indicating items, options, and finishes proposed, and referencing project specification section and paragraph covering the work in question. Indicate as follows:
   1. Performance characteristics and capacities.
   2. Dimensions and/or clearances required.
   3. Wiring, piping and control diagrams.

2.03 SAMPLES

A. Samples shall be identical to the precise article proposed, illustrating functional characteristics with all related parts and attachments. Indicate full range of color, textures and patterns.

B. Samples shall be identified by attaching a label on unexposed side of Samples that include the following:
   1. Generic Description of Sample.
   2. Product name and name of manufacturer.
   3. Number and title of applicable Specification Section.

C. Submit number of samples as indicated above. Where samples of large complete items such as light fixtures, hardware, etc. are required, one sample will suffice and that will be returned to the Contractor after review.

2.04 COLORS AND PATTERNS

A. Submit color and pattern selections for all products offering a choice of these attributes unless a specific color or pattern is referenced in the Contract Documents.

B. Submit within thirty five (35) days of Notice of Award a list of all required color selections organized by product, including manufacturer and model. Include samples of manufacturer's complete color range for all products.

C. Architect will not select colors or patterns until samples of all items requiring selections have been submitted. Architect will not make partial color selections.

D. Failure to submit all color selections as specified above, thus requiring additional unanticipated time for the Architect to make selections will not be basis for extension of Contract Time.

E. Architect will make color selections within 30 working days following complete submittal of samples. This time will commence with the receipt of the latest incremental submittal, as applicable.

F. Architect will issue Color Schedule.

PART 3 EXECUTION

3.01 ELECTRONIC SUBMITTAL PROCEDURES

A. Submittals shall be transmitted to the Architect in electronic, editable (PDF) format using the project's cloud-based file sharing and storage service ("project's website"). The cloud-based file sharing and storage service will be selected by the Architect.

B. Contractor's cost related to the use of the project's website services shall be included in the Contractor's bid.

C. The electronic submittal process is not intended for color samples, color charts, or physical material samples.

D. For the shop drawings larger than 11' x 17' size and Deferred Approvals, submit (3) hardcopies to the Architect and also submit electronically on the project's website. Provide additional hardcopies, as requested by Architect.

E. Provide hardcopy submittals if requested by Architect.

F. The Architect's review comments will be made available on the project's website for downloading.

G. Contractor will distribute a hardcopy of all reviewed submittals to the Inspector of Record, Owner, and Construction Manager.

3.02 ADMINISTRATION REQUIREMENTS

A. Name electronic file using the following identifiers, separated by dashes: consecutive submittal number, specification section number, revision number (if needed), and a brief description of the submittal contents; example: 15-05 5000-0 Metal Fabrications.

B. Write sequential page numbers at bottom of each page of submittal. On submittal cover sheet, provide brief description for product and coinciding page numbers; example: Pages 5-23 Metal Fabricated Gate Shop Drawings.

C. Provide the following on the submittal cover sheet:
   1. Project title and project number.
   2. Date.
   3. Submittal number.
   4. The name of:
      a. Architect/Engineer.
      b. Contractor.
      c. Subcontractor.
      d. Supplier.
      e. Manufacturer.
      f. Separate detailer when pertinent.
   5. Identification of product or material and page numbers.
   6. Submittal number, as described in 3.03.
   7. A blank space, 8 inches x 3 inches, for the contractor and Architects stamps.
   8. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements, and compliance with Contract Documents.

D. Unless otherwise indicated in technical specifications, not less than 15 days following Notice of Award, submit a complete submittal register utilizing spreadsheet provided by Architect. The architect provided submittal register is a template including most potential submittal items. Contractor shall strike through any submittal items not intended for submittal and highlight any revisions or additions to the template provided. All columns of information shall be filled out in full. Contractor shall then return edited spreadsheet to Architect for review. Spreadsheet format must not be altered to allow insertion into project data base. Once reviews are complete, the Architect will upload the submittal register into the project data base for all party's utilization.

3.03 IDENTIFICATION OF SUBMITTALS

A. Number submittals consecutively. Each specification section requiring submittal must at a minimum have one unique submittal number. DO NOT GROUP MULTIPLE SPECIFICATION SECTION ITEMS UNDER ONE SUBMITTAL NUMBER. Refer to submittal by this number in subsequent correspondence and submittals.
   1. Transmit re-submittals under new cover. Use submittal number of original submittal with revision number suffix. Cite original submittal number for reference.
   2. Do not transmit new submittals with alphabetic suffix.

B. Transmittal letter for each submittal shall show all information required for identification and checking.

C. Include submittal number on first page and elsewhere as required for identification.

D. Maintain log of submittals and status. Furnish copies to the Architect and Inspector upon request.

3.04 GROUPING OF SUBMITTALS

A. Transmit submittals in groups containing all associated items to ensure availability of information during review. However, each specification section must bear unique submittal number.

B. Incomplete or partial submittals may be returned for enhancement. No extension of time will be allowed for delays related to incomplete submittals.

3.05 SCHEDULING OF SUBMITTALS

A. Transmit submittals sufficiently in advance of installation for required review, revisions, re-submittals and delivery. Include time required for transmittal by regular mail between the parties involved. No extension of time will be allowed for delays related to late submittals.

B. Deferred approval submittals are subject to long lead times. Schedule submittals accordingly.

3.06 ARCHITECT'S REVIEW OF SUBMITTALS

A. Submittals will be reviewed and stamped by the Architect "No exceptions taken," "Submit specified item" or "Make corrections noted" to indicate full or conditioned approval or "Revise and resubmit" or "Rejected" to indicate disapproval. Terms are defined as follows:
   1. No Exceptions Taken: Accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. Does not constitute approval or deletion of specified or required items not shown in the partial submittal.
   2. Submit specified item: Submit to the Architect the items indicated for review.
   3. Correct as noted: Same as 1., except that minor corrections as noted shall be made by the Contractor. No resubmittal required.
   4. Revise and resubmit: Rejected because of major inconsistencies or errors which shall be resolved or corrected by the Contractor prior to subsequent review by the Architect.
   5. Rejected: Submitted material does not conform to plans and specifications in major respect. For example, wrong size, model, capacity or material. Resubmit.
   6. Receipt Acknowledged. Received, recorded and distributed without further action.

B. Submittals reviewed by the Architect which have been stamped shall be deemed to have the following language affixed and made a part thereof, regardless of the initial or subsequent readability of the actual stamp.

1. Corrections or comments made on submittals during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is for review of general conformance with the design concept of the project and general compliance with information given in the Contract Documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selection of fabrication processes and techniques of construction, coordinating the work of the trades; and performing the work in a safe and satisfactory manner.

C. Architect's review of submittals shall be undertaken with reasonable promptness, while allowing sufficient time in the Architect's professional judgment to permit adequate review.

E. Architect's review of submittals has, as a primary objective, to assist in the completion of the project on time and in conformance with the Contract requirements by permitting review of material and fabricated items prior to ordering. Architect's review of submittals is based only on the data presented and extends only to conformance with general design intent and information contained in the Contract Documents.

E. Architect's approval of submittals does not constitute final acceptance or unqualified approval of items or work proposed or put in place, nor does it constitute acceptance of responsibility for the accuracy, coordination or completeness of submittals. Architect's approval of submittals does not relieve the Contractor from the responsibility for errors, omissions, or compliance with all the requirements of the Contract Documents.

F. Reimbursement of the Architect's costs for review:
   1. Architect will record all time and expenses incurred to review submittals requiring more than two reviews.
   2. Contractor shall reimburse the District through deduction from amounts due the Contractor upon receipt of the Architect's billing and that of the Architect's consultants at standard billing rates for all time and expenses incurred in unanticipated reviews.

G. Architect's review of submittals does not change the Contract in any manner.

3.07 RESUBMITTAL

A. Make all corrections or revisions required by reviewer's comments at Contractor's expense and resubmit as initially specified above. No additional costs will be authorized for corrections or revisions.

B. Product data and shop drawings:
   1. Revise initial drawings or data and resubmit as initially specified.
   2. Indicate changes which have been made other than those requested by reviewer.

C. Submit new samples as initially specified.

3.08 DEFERRED APPROVAL

A. Items so designated in the Contract Documents are subject to deferred approval review by the Division of the State Architect (DSA).

B. Not less than 15 days following Notice of Award, submit all items specified for deferred approval complete with all structural calculations, test data and information as specified or as subsequently required by the reviewing agency, including original engineering stamps and original signatures as required. Architect shall submit to DSA only following Architect/Engineer review.
   1. The Architect will not approve deferred approval submittals until they are approved by DSA.

C. No work or fabrication shall begin until DSA approved submittals are distributed to the Contractor.

D. Contractor is notified that significant lead time is required for deferred approval review by DSA and shall schedule work accordingly. No extension of Contract Time will be allowed for delays incurred by deferred approval review.
   1. The Architect is not responsible for DSA delays in deferred approval review.

3.09 DISTRIBUTION

A. Distribute only submittals with Architect/Engineer (and DSA as applicable) stamps of review. Contractor is responsible for coordination of submittals and comments following review. Contractor to provide all additional reproduction costs for copies required by the Contractor at its expense. No additional costs will be authorized for Contractor costs pertaining to submittals.

END OF SECTION

SECTION 01 3543

SPECIAL PROJECT PROCEDURES – HAZARDOUS MATERIAL ABATEMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Section describes Special Project Administrative Procedures related to hazardous material abatement work. Special procedures outlined in this section modify, limit or extend the project administrative procedures specified in Division 01 sections as listed below.

B. Hazardous Materials Abatement: Contract Documents include documents describing Hazardous Material Abatement work to be performed as part of this Contract. These documents follow this section, prepared by HAZARDOUS MATERIAL ABATEMENT CONSULTANT:

1. Hazardous Materials Abatement Specifications:
2. Hayward Unified School District , Tennyson High School Modernization, Buildings A, B, C, D, G, L, M, N, O, P & S.
3. 27035 Whitman Street, Hayward, Ca 94544
   a. Prepared by SCA Environmental Inc, 2939 Summit Street, Oakland CA 94609, 510-645-6200, SCA Project number B-13490.02.
   b. Date: May 2, 2022.

C. Note this well. These documents are not prepared by Quattrocchi Kwok Architects, who has no responsibility for their content. Quattrocchi Kwok Architects will not respond to questions or correspondence related to Contract Documents prepared by the Hazardous Materials Abatement Consultant. Direct all correspondence concerning these documents and hazardous material abatement to Hazardous Materials Abatement Consultant. Correspondence directed to the Architect will be returned unreviewed.

D. RESPONSIBILITY FOR DELAY: The Contractor assumes responsibility for all delays caused by misdirected correspondence.

1.2 RELATED DOCUMENTS

A. The general provisions of the Contact, including General and Supplementary Conditions only apply to the Work of the Hazardous Materials Abatement Contract Documents prepared by Hazardous Materials Abatement Consultant as enumerated above.

B. General Requirements and Administrative procedures pertaining to Hazardous Materials Abatement work are specified elsewhere by Hazardous Materials Abatement Consultant as enumerated above.

C. General Requirements and Administrative procedures specified in Division 01 sections apply to Hazardous Materials Abatement work only to the extent specified in this Section.

1.3 SECTION 01 1100 – SUMMARY OF WORK

A. Refer to Hazardous Materials Abatement Contract Documents for additional information on the Contractor's use of the premises.

1.4 SECTION 01 2900 – APPLICATIONS FOR PAYMENT

A. Review of Progress Payments: Architect will not review the submittals of this Section 01-2900 related to Hazardous Material Abatement work.

1. Forward all submittals to Hazardous Material Abatement Consultant and obtain signature of responsible individual of Form G703 prior to submittal to Architect. Refer to Contract Documents by Hazardous Material Abatement Consultant for information.
2. Applications for Payment forwarded to Architect without prior review of Hazardous Material Abatement Consultant will be returned without action.

B. Schedule of Values:

1. Upon request of the Hazardous Material Abatement Consultant, support the values with data which will substantiate their correctness.
2. Schedule shall list the completed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction. Modify detail as requested by Hazardous Material Abatement Consultant.

C. Conditions of Payment: Upon delivery to the Architect for review, the Application for Payment shall bear the original signature of responsible individual representing Hazardous Material Abatement Consultant attesting their review and certification of payment requested.

D. Review of Progress Payment: Architect's review of the Application for Payment is not a representation that the Architect has reviewed the work of the Hazardous Material Abatement portion of the Contract.

1.5 SECTION 01 2600 – MODIFICATION PROCEDURES

A. Related Sections: General Requirements and Administrative Procedures of Hazardous Material Abatement work.

B. Request For Information ("RFI"): The Architect will not review or respond to RFI's concerning the Hazardous Materials Abatement Contract. Architect will return all such RFI's unreviewed. All such RFI's shall be forwarded to the Hazardous Materials Abatement Consultant by the Contractor directly. Refer to General Requirements and Administrative procedures specified elsewhere for the Hazardous Materials Abatement Contract which will govern this work.

C. Architect's Supplemental Instructions ("ASI"): The Architect will not issue ASI's concerning the Hazardous Materials Abatement Contract. All such ASI's or supplemental correspondence shall be addressed to the Contractor by the Hazardous Materials Abatement Consultant directly. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract specified elsewhere which will govern this work.

D. Request For Proposal ("RFP"): The Hazardous Materials Abatement Consultant shall prepare all RFP's pertaining to proposed changes in the Hazardous Materials Abatement work. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract specified elsewhere which will govern this work.

E. Change Order Request ("COR") All COR correspondence for the Hazardous Materials Abatement Contract shall be addressed from the Contractor to the Hazardous Materials Abatement Consultant directly. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work. Architect will not review COR's for Hazardous Materials Abatement Contract.

1.6 SECTION 01 3300 – SUBMITTALS

A. The Architect will not review or respond to submittals for the Hazardous Materials Abatement Contract. Architect will return all such submittals unreviewed to the Contractor. All such submittals shall be forwarded to the Hazardous Materials Abatement Consultant by the Contractor directly. Refer to General Requirements and Administrative procedures specified elsewhere for the Hazardous Materials Abatement Contract which will govern this work.

1.7 SECTION 01 3546 – CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN

A. This section excludes Hazardous Materials Abatement work. Indoor Air Quality for Hazardous Materials Abatement work is specified elsewhere.

1.8 SECTION 01 3900 - COORDINATION AND MEETINGS

A. Pre-Construction Meeting Attendance Required: Hazardous Material Abatement Consultant and Contractor.

B. Site Mobilization Meeting Attendance Required: Hazardous Material Abatement Consultant and Contractor.

1.9 SECTION 01 4000 - QUALITY CONTROL

A. This section excludes Hazardous Materials Abatement work. Quality Control for Hazardous Materials Abatement work is specified elsewhere.

1.10 SECTION 01 4200 - REFERENCE STANDARDS

A. General Requirements, Referenced Standards and Administrative Procedures of Hazardous Material Abatement included in Contract Documents prepared by the Hazardous Material Abatement Consultant are referenced as a standard.

1.11 SECTION 01 4523 - TESTING AND INSPECTION SERVICES

A. Testing and Inspection requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.12 SECTION 01 5000 – TEMPORARY FACILITIES

A. Temporary Facilities for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.13 SECTION 01 5600 – TEMPORARY CONTROLS

A. Temporary Controls for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.14 SECTION 01 6000 – PRODUCT REQUIREMENTS

A. Product Requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.15 SECTION 01 6116 – VOLATILE ORGANIC COMPOUND (VOC) RESTRICTIONS

A. VOC Requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.16 SECTION 01 7000 – CONTRACT CLOSEOUT

A. Contract Closeout Requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

B. Closeout Submittals for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.17 SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT

A. Construction Waste Management Requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.18 SECTION 01 7500 – STARTING OF SYSTEMS

A. Starting of Systems Requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.19 SECTION 01 7513 – EXECUTION REQUIREMENTS

A. Execution Requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

1.20 SECTION 01 8113 – SUSTAINABLE DESIGN REQUIREMENTS

A. Sustainable Design Requirements for Hazardous Materials Abatement work are specified elsewhere. Refer to General Requirements and Administrative procedures for the Hazardous Materials Abatement Contract which will govern this work.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 DOCUMENTS PREPARED BY HAZARDOUS MATERIALS ABATEMENT CONSULTANT FOLLOW THIS SECTION

APPENDICES

These Contract Documents are provided by the Owner and were not prepared under the responsible

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 DOCUMENTS PREPARED BY HAZARDOUS MATERIALS ABATEMENT CONSULTANT FOLLOW THIS SECTION

APPENDICES

These Contract Documents are provided by the Owner and were not prepared under the responsible charge of the Architect, nor were they reviewed by DSA. The Contract Work covered by these Documents will be administered by the Owner.

Summary Report 92 pp
Hazardous Materials Abatement Specifications 67 pp

END OF SECTION

SUMMARY REPORT: ASBESTOS, LEAD AND HAZARDOUS MATERIALS SURVEY TENNYSON HIGH SCHOOL MODERNIZATION BUILDINGS A, B, C, D, E, F, G, L, M, N, O, P & S 27035 WHITMAN STREET HAYWARD, CA 94544

PREPARED FOR:

HAYWARD UNIFIED SCHOOL DISTRICT
24411 AMADOR STREET
HAYWARD, CA 94544

AND

MS. JESSICA LEE
DEPUTY DIRECTOR
TRIGROUP, INC.
1313 NORTH MILPITAS BOULEVARD, SUITE 135
MILPITAS, CA 95035

PREPARED BY:

SCA

ENVIRONMENTAL, INC.

3637 GRAND AVENUE, #C
OAKLAND, CA 94610
TEL: (510) 645-6200

SCA PROJECT NO.: B-13490.02

UPDATED JULY 21, 2022

SUMMARY REPORT
ASBESTOS, LEAD AND HAZARDOUS MATERIALS SURVEY
MOUNT EDEN HIGH SCHOOL MODERNIZATION
BUILDINGS A, B, C, D, E, F, G, L, M, N, O, P & S
27035 WHITMAN STREET
HAYWARD, CA 94544

CONDUCTED FOR

HAYWARD UNIFIED SCHOOL DISTRICT
24411 AMADOR STREET
HAYWARD, CA 94544

AND

MS. JESSICA LEE
DEPUTY DIRECTOR
TRIGROUP, INC.
1313 NORTH MILPITAS BOULEVARD, SUITE 135
HAYWARD, CA 94544

UPDATED JULY 21, 2022

SCA PROJECT NO. B-13490.02

REVIEWED BY:



DAN LEUNG, CIH, CSP, CAC, CDPH
Senior Project Consultant
(415) 867-9544
dleung@sca-enviro.com

SCA ENVIRONMENTAL, INC.
3637 GRAND AVENUE, #C
OAKLAND, CA 94610
TEL: (510) 645-6200

Table of Contents

1.0 Executive Summary 1
2.0 Introduction 4
3.0 Methodology 5
3.1 Asbestos Containing Materials 5
3.2 Lead-Based Paints 5
3.3 Polychlorinated Biphenyls 5
3.4 Mercury 5
3.5 Other Hazardous Materials 5
4.0 Applicable Standards 6
4.1 Asbestos-Containing Materials 6
4.2 Lead-Based Paints 6
4.4 Other Hazardous Materials 8
5.0 Results and Conclusions 10
5.1 Asbestos 10
5.2 Non-Asbestos Materials (non-ACM) 10
5.3 Lead-Based Paints 12
5.4 Polychlorinated Biphenyls 12
5.5 Mercury 13
5.6 Other Hazardous Materials 13
6.0 Limitations and Exclusions 14

Tables 1 and 2. Materials Matrix Reports (MMRs)

Figures 1 – 14. Sample Location Diagrams

Attachments
1. Asbestos Laboratory Reports
2. Lead Laboratory Reports

List of Common Acronyms and Abbreviations

AAA	= Assumed Asbestos-Containing Materials
ACM	= Asbestos-Containing Materials
AHERA	= Asbestos Hazard Emergency Response Act
BAAQMD	= the Bay Area Air Quality Management District
BK	= black paints
BL	= blue paints
BR	= brown paints
CAC	= Certified Asbestos Consultant
Cal/OSHA	= the California Division of Industrial Safety and Health
Cal/EPA	= the California Environmental Protection Agency
CAULK	= window and door perimeter caulking
CCR	= California Code of Regulations
CERCLA	= Comprehensive Environmental Response, Compensation, and Liability Act
CFR	= Code of Federal Regulations
CHMM	= Certified Hazardous Materials Manager
CIH	= Certified Industrial Hygienist
CPSC	= Consumer Product Safety Commission
CR	= cream-colored paints
CSST	= Certified Site Surveillance Technician
DOHS	= the California Department of Health Services
DS/PLM	= Polarized Light Microscopy with Dispersion Staining
EPA	= the U.S. Environmental Protection Agency
EPRI	= Electric Power Research Institute
EXPJNT	= expansion joint
FIFRA	= Federal Insecticide, Fungicide, and Rodenticide Act
FLVCS	= linoleum flooring
FLVCT	= vinyl composite floor tiles
ft^2	= square feet
GN	= green paints
GROUT	= ceramic tile and concrete grouts
GY	= gray paints
HUD	= the U.S. Department of Housing and Urban Development
LBP	= Lead-Based Paints
LF	= linear feet
$\mu g/cm^2$	= micrograms per centimeter squared
µg/g	= microgram per gram or equivalent to parts per million
$\mu g/m^3$	= micrograms per cubic meter
µm	= microns
mg/cm^2	= milligrams per squared centimeter
mg/kg	= milligrams per kilogram
MR	= maroon paints
OL	= olive paints
OR	= orange paints
OSHA	= the federal Occupational Safety and Health Administration
OW	= off white paints
PCB	= Polychlorinated Biphenyl
PEL	= Permissible Exposure Level
Penta	= Pentachlorophenol

List of Common Acronyms and Abbreviations Cont.

PISTM	= steam thermal system pipe insulation
PK	= pink paints
ppm	= parts per million
PUTTY	= window pane putty
QA/QC	= Quality Assurance/Quality Control
RCRA	= Resource Conservation Recovery Act
RCW	= Regulated Controlled Waste
RD	= red paints
REA	= Registered Environmental Assessor
RFAG	= built-up tar and gravel roofing
RFPTCH	= roof patching compounds
RFROLL	= rolled roofing
RWQCB	= the Regional Water Quality Control Board
SF	= square feet
TN	= tan paints
TSI	= Thermal System Insulation
WAC	= Washington Administrative Code
WH	= white paints
WLCER	= ceramic wall tiles
WLPL	= wall plaster
YW	= yellow paints

1.0 Executive Summary

SCA Environmental, Inc. (SCA) conducted a pre-renovation hazardous materials survey for lead-based paints, asbestos-containing construction materials, and associated environmental hazards for Buildings A, B, C, D, G, L, M, N, O, P and S at Tennyson High School located at 27035 Whitman Street in Hayward, CA between April 12 - 14, 2022. A follow-up site visit was conducted for Buildings E and F on June 30, 2022.

Prior to any renovations or demolition, the National Emission Standard for Hazardous Air Pollutants (NESHAP) mandated by the Environmental Protection Agency (EPA) and locally enforced by the Bay Area Air Quality Management District (BAAQMD) require that properties be inspected for asbestos-containing materials (ACM) and materials subject to damage or which will be made friable, be removed.

Sampling by SCA in April and June 2022 found the following:

1. Confirmed Asbestos: Four (4) confirmed asbestos-containing materials that may be impacted by the proposed renovation activities. The quantities and locations are inventoried in Tables 1 and 2.

Material ID	Asbestos-containing Materials Description	Asbestos Content
SINK-6	Stainless steel sink w/black undercoating	8% CH
9FLVCT/M-22	9”x9” Green vinyl floor tile (+) w/black mastic (-)	8-10% CH
CARMAS-42	Tan carpet glue (+)/black mastic (-) under gray carpets	3-6% CH
9FLVCT/M-53	9”x9” Tan w/brown streaks vinyl floor tile (+) w/black mastic (-)	8% CH

Notes: CH = Chrysotile, (+) = Asbestos, (-) = Non-asbestos

2. Assumed Asbestos: Four (4) assumed asbestos-containing materials that may be impacted by the proposed renovation activities. Destructive sampling is required prior to any renovation or demolition activities.

Material ID	Assumed Asbestos Materials Description	Asbestos Content
FL-AAA1	Felt under hardwood floors	Assumed >1%
FIREDOOR-AAA2	Fire-rated core in 20-min fire doors	Assumed >1%
VAPBAR-AAA3	Waterproofing membrane and/or vapor barrier below floor finishes	Assumed >1%
VAPBAR-AAA2	Vapor barrier underneath floor finishes	Assumed >1%

Note: AAA = Assumed Asbestos-Containing

Prior to demolition activities, the National Emission Standard for Hazardous Air Pollutants (NESHAP) mandated by the Environmental Protection Agency (EPA) and locally enforced by the Bay Area Air Quality Management District (BAAQMD) requires:

a. Buildings to be inspected for asbestos-containing materials prior to building demolition; and
b. Materials that are subject to damage or which will be made friable be removed.

3. Negative Asbestos: Numerous suspect materials that may be impacted by the proposed renovation activities were tested or observed negative for asbestos, as listed below.

Material ID	Non-Asbestos Materials Description
12FLVCT/M-1	12”x12” Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound
WLSH/CLSH-2	Wall and ceiling sheetrock w/tape and join compound
BBMAS-3	4”/6” Blue vinyl baseboard w/off-white glue
FORMICA-4	Various colored formica counter top w/yellow glue
SINK-5	Stainless steel sink w/gray undercoating
FIREDOOR-7	Off-white core in fire doors

Material ID	Non-Asbestos Materials Description
WLPL/CLPL-8	Off-white skimcoat over coarse gray wall and ceiling plaster
12FLVCT/M-9	12”x12” Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound
12FLVCT/M-10	12”x12” Off-white w/black streaks vinyl floor tile w/yellow glue over 12FLVCT/M-9
CARMAS-11	Blue/yellow carpet glue under gray carpets (all over 12FLVCT/M-9)
WLPL/CLPL-12	Off-white skimcoat over coarse gray wall and ceiling plaster
BBMAS-13	4” Blue vinyl baseboard w/off-white glue
CONC-14	Gray concrete sidewalk
12FLVCT/M-15	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
WLPL/CLPL-16	Off-white skimcoat over coarse gray wall and ceiling plaster
BBMAS-17	4”/6” Blue vinyl baseboard w/off-white glue
FORMICA-18	Black/gray formica counter top w/yellow glue
SINK-19	Stainless steel sink w/gray undercoating
CLGL-20	12”x12” Off-white glued-on ceiling tile w/yellow glue
WLCER-21	6”x6” Yellow ceramic wall tile w/off-white grout and mortar
SINK-23	Stainless steel sink w/black undercoating
SINK-24	Black composite sink
12FLVCT/M-25	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
CARMAS-26	Yellow carpet glue under gray carpets
WLPL/CLPL-27	Off-white skimcoat over coarse gray wall and ceiling plaster
BBMAS-28	4”/6” Blue vinyl baseboard w/off-white glue
CLGL-29	12”x12” Off-white glued-on ceiling tile w/yellow and brown glue
WLCER-30	6”x6” Yellow ceramic wall tile w/off-white grout and mortar
FORMICA-31	Various colored formica counter top w/yellow glue
SINK-32	Stainless steel sink w/gray undercoating
WLPL/CLPL-33	Off-white textured skimcoat over coarse gray wall and ceiling plaster
WLPL/CLPL-34	Off-white skimcoat over coarse gray wall and ceiling plaster
CLGL-35	12”x12” Off-white nailed-on ceiling tile (some w/brown glue)
12FLVCT/M-36	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
WLPL/CLPL-37	Coarse off-white wall and ceiling plaster
BBMAS-38	4” Blue vinyl baseboard w/off-white glue
CLGL-39	12”x12” Off-white glued-on ceiling tile w/brown glue (some glued on walls)
CONC-40	Gray concrete stage
12FLVCT/M-41	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
BBMAS-43	4” Blue vinyl baseboard w/off-white glue
CLLI-44	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures
CLLI-45	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures (replacements)
CARMAS-46	Yellow carpet glue under gray carpets
12FLVCT/M-47	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
BBMAS-48	4” Blue vinyl baseboard w/off-white glue
FLCER-49	2”x1”/2”x2” Green/blue ceramic floor tile w/gray grout and mortar
WLPL/CLPL-50	Gray textured wall and ceiling plaster
WLCER-51	4”x4” Yellow/white ceramic wall tile w/off-white grout and gray mortar
CLTL-52	12”x12” Off-white nailed-on ceiling tile
BBMAS-54	4” Brown vinyl baseboard w/brown glue
CLGL-55	12”x12” Off-white glued-on ceiling tile w/brown glue
CLSP-56	12”x12” Off-white splined ceiling tile w/pinholes and fissures
12FLVCT/M-57	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
PAINT-58	Red/brown paint on concrete floors (some w/residual yellow carpet glue)
BBMAS-59	4”/6” Black/blue vinyl baseboard w/off-white glue
FORMCA-60	Various colored formica counter top w/yellow glue
SINK-61	Stainless steel sink w/black undercoating
12FLVCT/M-62	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
BBMAS-63	4” Blue vinyl baseboard w/off-white glue
CLLI-64	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures
PI-NNN1	Fiberglass insulation on pipes and fittings

Material ID	Non-Asbestos Materials Description
WL-NNN2	Off-white painted wood wall and/or compressed board wall w/vinyl covering
PI-1	Yellow fiberglass insulation with plastic jacket and white silicone on pipe sticking out from slab
CLLI-2	2'x4' off-white laid-in ceiling tiles with pin hole
WL-3	4'x10' beige compressed wall panels with sheetrock base
WLPL/CLPL-4	Off-white painted wall/ceiling plaster
CARMAS-5	Blue/clear mastic with off-white leveling compound on concrete underneath blue/tan/red carpet
FLVCT-6	12"x12" light blue vinyl floor tiles with yellow mastic on concrete
BBMAS-7	Beige mastic over brown mastic behind 4" blue vinyl baseboard
WLSH/CLSH-8	Off-white painted wall sheetrock with tape and joint compound (concealed by compressed wall panels (WL-3) at perimeter walls of classrooms, and covered with wall paper in offices)
CAULK-9	Off-white caulking on equipment, duct and conduit
CLGL-10	12"x12" off-white with fissures glued-on ceiling tiles with yellow mastic
CL-11	12"x12" off-white with pin hole nailed-on ceiling tiles
CL-12	12"x12" off-white with fissures nailed-on ceiling tiles
BBMAS-13	Beige/brown mastic behind 4" & 6" blue vinyl baseboard
FLVCT-14	12"x12" blue vinyl floor tiles with yellow mastic and gray leveling compound on concrete (Corridor West and Middle, E02, E03, E05, E06, E11, E13 and E15)
FLVCT-15	12"x12" blue vinyl floor tiles with black mastic and gray leveling compound on concrete (Corridor East, E04, E07, E08, E09, E10, E12, E14, E16, E17, E18, E19, E20, E21 and E22)
WLCER-16	4"x4" off-white/gray ceramic wall tiles with tan glue and gray grout
FLCER-17	2"x2" gray ceramic floor tiles with gray grout and mortar
CLGL-18	2'x4' off-white glued-on/nailed-on ceiling tiles with 12"x12" square pattern
WLSH-19	Wall sheetrock with tape and joint compound
WLPL/CLPL-20	Off-white painted wall/ceiling plaster with skimcoat
WLPL/CLPL-21	Off-white painted coarse wall/ceiling plaster on sheetrock base
CAULK-22	Gray caulking around exterior window frames and louver
WLCER-23	6"x6" yellow ceramic wall tiles with white grout

Lead-based paints (LBP) or building materials with high lead content, as defined by U.S. Department of Housing and Urban Development (HUD), were identified and are as follows:

Building G:

- Blue paint on structural steel in gym [SCA Sample I.D. BL-7 with 55,000 ppm (5.5%)].

Building F:

- Off-white paint on door frame [SCA Sample I.D. OW-2 with 35,000 ppm].

All site paints require demolition dust controls and personal protective procedures in compliance with Cal/OSHA's Construction Lead Standard, 8 CCR 1532.1.

2.0 Introduction

This report summarizes the results of the pre-renovation hazardous materials survey for lead-based paints, asbestos-containing construction materials, and associated environmental hazards for Buildings A, B, C, D, E, F, G, L, M, N, O, P and S at Tennyson High School located at 27035 Whitman Street in Hayward, CA.

- Asbestos-containing materials (ACM);
- Lead-based paints (LBP);
- Polychlorinated biphenyls (PCB) in lighting ballasts;
- Fluorescent light bulbs containing mercury;
- Other environmental hazards as noted.

Individuals involved in the survey, and their technical certifications, include:

SCA Staff	Role	Certifications
Dan Leung, CIH, CSP, CAC, CDPH	Senior Project Consultant	• Certified Industrial Hygienist (CIH #10893) • Certified Safety Professional (CSP #23562) • Cal/OSHA Certified Asbestos Consultant (CAC #07-4175) • CDPH-Accredited Lead Inspector/Assessor and Project Monitor (CDPH #7329) • OSHA 40-hr HAZWOPER Training per 29 CFR 1910.120(e).
Stanley Chaowen Huang, CSST, CDPH	Industrial Hygienist	• Cal/OSHA Certified Site Surveillance Technician (CSST #16-5737) • CDPH-Accredited Lead Inspector/Assessor (CDPH #LRC-00009179) • OSHA 40-hr HAZWOPER Training per 29 CFR 1910.120(e).

The contract laboratories that provided analytical services for the project were:

Laboratory	Analysis Type	Accreditation
Reservoirs Environmental, Inc. (REI) Denver, CO	Bulk Asbestos Analysis by Polarized Light Microscopy (PLM), and Atomic Absorption Spectroscopy (AAS) / Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) for Lead	• National Voluntary Laboratory Accreditation Program (NVLAP # 101896-0). • AIHA Laboratory Accreditation Program (AIHA-LAP #101533).
Asbestos TEM Laboratories, Inc. (ATEM) Oakland, CA	Bulk Asbestos Analysis by Polarized Light Microscopy (PLM), and Atomic Absorption Spectroscopy (AAS) for Lead	• National Voluntary Laboratory Accreditation Program (NVLAP # 101891-0). • AIHA Laboratory Accreditation Program (AIHA-LAP #101754).

3.0 Methodology

3.1 Asbestos Containing Materials

Asbestos sampling was performed in a fashion designed to minimize exposure of the surveyor or others to airborne asbestos fibers. Samples were typically removed from the substrate utilizing a knife or hollow drill bit bored through a wet sponge; the sample material was then placed into an airtight plastic vial. The vial's exterior was decontaminated with a wet sponge, and a unique sample I.D. written on the vial. The vial was then stored in a plastic bag.
Samples of suspect materials were collected using triplicate sampling procedures. Under these procedures, the first sample is analyzed. If it tests positive for asbestos (>1%), the analysis is suspended for further samples of that material. If the first sample tests only trace positive (between 0.1 to 1%), or negative, then the second and third samples are analyzed sequentially, in order to determine the possible presence of asbestos. If all three samples test negative, the material is considered as non-asbestos. If one or more samples test "trace" positive (<1%), the material is considered to be trace positive. If one or more samples are positive for asbestos, the material is considered positive.

Certain materials, such as plasters and gypboard or sheetrock systems, are frequently non-homogeneous in content. For such materials, multiple samples were gathered at various points in the building, with all samples analyzed to determine the possible presence of asbestos.

All asbestos samples collected were submitted to REI for analysis by polarized light microscopy with dispersion staining (DS/PLM). The Bay Area Air Quality Management District's (BAAQMD), the Federal Environmental Protection Agency's (EPA), and California Environmental Protection Agency's (Cal/EPA) regulations all specify the DS/PLM method.

3.2 Lead-Based Paints

Construction records or drawings concerning paints at the site were not available. Paint chip samples from different interior surfaces were collected and analyzed by Atomic Absorption Spectroscopy (AAS)/Inductively Coupled Plasma – Mass Spectrometry (ICP-MS).

Please note that although LBP were defined against the HUD standard, Cal/OSHA's Construction Lead Standard, 8 CCR 1532.1, applies to all paints with any measured lead content, requiring dust control measures to reduce airborne and ingestion lead dust hazards.

3.3 Polychlorinated Biphenyls

PCB-containing ballasts in fluorescent light fixtures can be identified by visually examining the ballasts in a representative number of light fixtures in the building. The ballast manufacturing industry has taken the active step of labeling new non-PCB containing ballasts, so that any ballast not labeled as ‘non-PCB’ or ‘No PCBs’ can reasonably be assumed to contain PCB.

3.4 Mercury

Fluorescent lamps, which contain mercury vapors, were visually observed by SCA during the survey of the buildings in several areas. Mercury is a neurotoxin and a hazardous waste, and Cal/EPA currently regulates its disposal. All mercury-containing lamps, thermostats and switches require recycling or disposal as “universal” waste as of January 2006 within California.

3.5 Other Hazardous Materials

Paints, solvents, cleaning supplies, electronic equipment, batteries and other materials and systems classified as hazardous waste remaining in the building following the tenants move-out were inventoried and identified. These items will require proper removal, disposal and/or recycling.

4.0 Applicable Standards

4.1 Asbestos-Containing Materials

ACM is defined by EPA regulations as those substances containing greater than 1% asbestos. The Bay Area Air Quality Management District and the Cal/EPA provide local enforcement of these regulations. Friable ACM with greater than 1% asbestos needs to be disposed of as asbestos waste.

Prior to demolition of a building, the Bay Area Air Quality Management District requires abatement of Regulated Asbestos Containing Materials RACM (practically, this means all friable and non-friable ACM).

RACM is defined as (a) Friable – the material can be crumbled, pulverized or reduced to powder by hand pressure, (b) Category 1 that are subjected to sanding, grinding, cutting or abrasion, (c) Category I materials that becomes friable during demolition or renovation activities, or (d) Category II materials that become friable during demolition or renovation activities.

Federal Occupational Safety and Health Administrations (OSHA) regulations, locally enforced by CAL/OSHA, defines ACM as substances that contain greater than 1% asbestos. Cal/OSHA also mandates special training, medical exams, personal protective equipment and record keeping for employees working with ACM. If a material contains less than 1% asbestos but more than 0.1% asbestos, the material may be disposed of as non-ACM, but the Cal/OSHA requirements would still have to be followed regarding workers' protection and Contractor licensing.

"Trace" materials are currently regulated in California and require the following:

- Removal using wet methods;
- Prohibition of removal using abrasive saws or methods which would aerosolize the material;
- Prompt clean-up of the impacted zone, using HEPA-filtered vacuums, as applicable;
- Employer registration by Cal/OSHA for removal quantities exceeding 100 sq. ft. per year; and
- Cal/OSHA Carcinogen Registration by the Demolition or Abatement Contractor impacting such materials.

Further detail regarding various California asbestos regulations can be found from the following websites:

- http://www.dir.ca.gov/title8/1529.html
- http://www.arb.ca.gov/enf/asbestos/asbestos.htm
- http://www.dtsc.ca.gov/LawsRegsPolicies/Title22/upload/OEARA_REG_Title22_Ch11_Art3.pdf
- http://www.epa.gov/asbestos/pubs/help.html
- http://www.epa.gov/asbestos/pubs/asbreg.html
- https://www.valleyair.org/busind/comply/AssistanceDocuments/CAB_asbestos_july2006.pdf

4.2 Lead-Based Paints

Certain existing painted or coated surfaces to be impacted by the proposed renovation are known to contain lead.

Since elemental lead is a suspect carcinogen and known teratogen and neurotoxic in high doses, lead-containing materials need to be identified prior to the on-set of demolition activities. Using combinations of engineering controls and personal protective equipment, lead-containing materials can be removed safely. Several sources of applicable standards are listed as follows:

1. Lead exposures in the workplace are regulated by Cal/OSHA, which has certain regulatory requirements for identifying and controlling potential lead exposures. Currently applicable regulations for the construction industry have been adopted by Cal/OSHA (8 CCR 1532.1) from the Federal OSHA regulations. The current OSHA 8-hour Permissible Exposure Level (PEL) for lead is 50 $\mu g/m^3$.

2. Current EPA and Cal/EPA regulations do not require LBP to be removed prior to demolition, unless loose and peeling. Provided that the paints are securely adhered to the substrates (i.e., non-flaking or non-peeling), disposal of intact demolition debris can generally be handled in California as non-hazardous and non-RCRA waste. Disposal requirements are as follows:

Classification and Disposal of Inorganic Lead Wastes in California

Standards	**TTLC**	**Leachable Lead**						
Concentations	**1000 mg/kg**	**5 mg/L**						
	Test Methods & Results			**Classifications**				
Condition	**Total Pb (mg/kg)**	**STLC Pb (mg/L)**	**TCLP Pb (mg/L)**	**Non-haz waste**	**CalHaz (Non-RCRA)**	**Fed Haz (RCRA)**	**Stabilization Required**	**Landfill Class**
1a	<50 (a1)	NA		Yes	no	no	no	III
1b	<100 (a2)		NA	Yes	no	no	no	III
2a	50 to <1000	<5	<5	Yes (c)	no	no	no	III or II (d)
2b		>5	<5	no	Yes	no	no	I
2c		>5	>5	no	Yes	Yes	Yes	I
2d (b)		<5	>5	no	no	Yes	Yes	I
3a	>1000	<5	<5	No	Yes	No	no	I
3b		>5	<5	no	Yes	no	no	I
3c		>5	>5	no	Yes	Yes	Yes	I
3d (b)		<5	>5	no	no	Yes	Yes	I
4	any	any	>5	no	no	Yes	Yes	I

(a1) 50 = 10 x 5 (STLC for Pb). Per WET method, impossible to exceed STLC even if 100% soluble.
(a2) 100 = 20 x 5 (TCLP for Pb). Per TCLP method, impossible to exceed STLC even if 100% soluble.
(b) Physically impossible due to the stronger acid used in WET than TCLP.
(c) Landfills will likely require documentation that TCLP is <5, even though TCLP is almost always less than WET.
(d) Landfill dependent, function of permit, landfill liner, or landfill policy

In California, loose and peeling LBP or other wastes require characterization and testing for leachability to determine if the materials would be classified as a RCRA or California hazardous waste.

3. The major definitions of LBP or lead-coated surfaces are listed as follows:

   - HUD defines LBP as paint that contains either $\geq$0.5% by weight of lead, or $\geq$1 mg/cm^2.
   - Consumer Product Safety Commission (CPSC) prohibits the manufacturing of paint that contains more than 90 ppm of lead.

4. Lead is on the "Proposition 65" list, based on its potential to cause reproductive harm.

5. The California Department of Public Health (CDPH) requires the use of Certified Lead Workers and Supervisors for lead abatement projects at public buildings with a greater than 20 years expected life or whenever work is completed specifically to abate Lead-Based paints as defined by HUD. The CDPH certification requirements do not apply to industrial sites; however, dust controls and personnel protection are still required under 17 CCR Section 35001 through 36100.

4. New Renovation, Repair and Painting Rules finalized by the U.S. Environmental Protection Agency on June 23, 2008, authorized under section 402(c)(3) of the Toxic Substances Control Act (TSCA) require any Contractor or Maintenance Personnel disturbing more than 6 sq. ft. of interior or 20 sq. ft. of exterior lead-based paints (LBPs) in pre-1978 housing or child-occupied facilities to complete EPA-accredited

training or 4-hr. EPA-accredited refresher training, as applicable, for lead safe work practices. Persons performing renovations, repairs and/or painting projects in target housing or child-occupied facilities must provide "Renovate Right" brochures to the Owners and occupants after December 22, 2008. Window replacements are subject to the standards. These standards prohibit certain dangerous work practices, such as open flame burning or torching of lead-based paints. Required work practices include posting of warning signs, restricting occupants from work areas, containing work areas to prevent dust and debris from spreading, conducting a thorough cleanup and verifying that the cleanup is effective. Additional rules and information are available at www.epa.gov/lead.

"Certified Renovators" shall perform the following tasks:

- Perform or direct uncertified workers performing regulated renovation activities;
- Provide training to uncertified workers on lead safe work practices;
- Be on-site during key stages of the renovation and otherwise be available on-site or by telephone at other times;
- Use an acceptable lead test kit to determine whether lead-based paints are present in an affected area.

Firms may apply for certification beginning in October 2009 and must be certified by April 2010.

As an inventory of paints was not performed for the project, for the purpose of complying with the Cal/OSHA lead in construction regulation (8 CCR 1532.1), all coated surfaces shall be considered to contain some lead and require demolition dust control procedures for compliance with Cal/OSHA's Construction Lead Standard under 8 CCR 1532.1. The aforementioned regulation contains requirements for lead air monitoring, work practices, respiratory protection, etc., that are triggered by the presence of even very low levels of lead.

None of the applicable regulations require removal of lead paint prior to renovation if the paints are securely adhered to the substrates (i.e., non-flaking or non-peeling). Disposal of the demolition debris in this case can be handled as non-hazardous and non-RCRA waste after the loose and flaking paint have been removed, as long as demolition practices do not compromise worker safety and waste stream characterization testing has been performed for verification. Additional sampling and analysis for leachable lead content by the Contractor or Consultant during demolition will be required for waste characterization

Conventional demolition techniques should be employed for all painted surfaces with the Contractor complying with applicable OSHA and Cal/OSHA statutes regarding:

- Worker awareness training;
- Exposure monitoring, as needed;
- Medical examinations, which may include blood lead level testing; and
- Establishing a written respiratory protection program.

For projects involving welding or torch-cutting coated metals, the coating should be stripped for a distance of at least four inches from the area of heat application in compliance with 8 CCR 1537.

4.3 Polychlorinated Biphenyls

Bulk wastes containing >50 ppm PCB must be disposed of as PCB bulk product waste according to 40 CFR § 761.62 which involves disposal in a TSCA incinerator, a TSCA chemical waste landfill, a RCRA hazardous waste landfill, under a TSCA approved alternate disposal method, under the TSCA regulated decontamination procedures; or in a facility with a coordinated approval issued under TSCA. Waste with detected levels of PCB <50 ppm may be disposed of in non-TSCA approval landfill facilities, including municipal solid waste landfills subject to state and local regulations regarding such disposal.

4.4 Other Hazardous Materials

Cal/EPA regulates disposal of the following additional items as 'universal' hazardous waste:

- Paints, varnishes and stains;

- Cleaning fluids and solvents;
- Batteries (car and household);
- Automotive filters and fluids
- Pesticides, herbicides, fertilizers and poisons;
- Medical waste;
- Television and computer monitors;
- Propane or gas tanks;
- Aerosol containers; and
- Photo chemicals.

5.0 Results and Conclusions

5.1 Asbestos

The detailed results are shown in the Laboratory Reports in Attachment 1 and quantified in the Materials Matrix Reports in Tables 1 and 2. Sample locations are shown on the drawings included as Figures 1 - 10.

Sampling by SCA in April and June 2022 found the following:

1. Confirmed Asbestos: Four (4) confirmed asbestos-containing materials that may be impacted by the proposed renovation activities. The quantities and locations are inventoried in Tables 1 and 2.

Material ID	Asbestos-containing Materials Description	Asbestos Content
SINK-6	Stainless steel sink w/black undercoating	8% CH
9FLVCT/M-22	9”x9” Green vinyl floor tile (+) w/black mastic (-)	8-10% CH
CARMAS-42	Tan carpet glue (+)/black mastic (-) under gray carpets	3-6% CH
9FLVCT/M-53	9”x9” Tan w/brown streaks vinyl floor tile (+) w/black mastic (-)	8% CH

Notes: CH = Chrysotile, (+) = Asbestos, (-) = Non-asbestos

2. Assumed Asbestos: Four (4) assumed asbestos-containing materials that may be impacted by the proposed renovation activities. Destructive sampling is required prior to any renovation or demolition activities.

Material ID	Assumed Asbestos Materials Description	Asbestos Content
FL-AAA1	Felt under hardwood floors	Assumed >1%
FIREDOOR-AAA2	Fire-rated core in 20-min fire doors	Assumed >1%
VAPBAR-AAA3	Waterproofing membrane and/or vapor barrier below floor finishes	Assumed >1%
VAPBAR-AAA	Vapor barrier underneath floor finishes	Assumed >1%

Note: AAA = Assumed Asbestos-Containing

5.2 Non-Asbestos Materials (non-ACM)

Non-asbestos materials sampled and documented by SCA include:

Material ID	Non-Asbestos Materials Description
12FLVCT/M-1	12”x12” Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound
WLSH/CLSH-2	Wall and ceiling sheetrock w/tape and join compound
BBMAS-3	4”/6” Blue vinyl baseboard w/off-white glue
FORMICA-4	Various colored formica counter top w/yellow glue
SINK-5	Stainless steel sink w/gray undercoating
FIREDOOR-7	Off-white core in fire doors
WLPL/CLPL-8	Off-white skimcoat over coarse gray wall and ceiling plaster
12FLVCT/M-9	12”x12” Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound
12FLVCT/M-10	12”x12” Off-white w/black streaks vinyl floor tile w/yellow glue over 12FLVCT/M-9
CARMAS-11	Blue/yellow carpet glue under gray carpets (all over 12FLVCT/M-9)
WLPL/CLPL-12	Off-white skimcoat over coarse gray wall and ceiling plaster
BBMAS-13	4” Blue vinyl baseboard w/off-white glue
CONC-14	Gray concrete sidewalk
12FLVCT/M-15	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
WLPL/CLPL-16	Off-white skimcoat over coarse gray wall and ceiling plaster
BBMAS-17	4”/6” Blue vinyl baseboard w/off-white glue
FORMICA-18	Black/gray formica counter top w/yellow glue

Material ID	Non-Asbestos Materials Description
SINK-19	Stainless steel sink w/gray undercoating
CLGL-20	12”x12” Off-white glued-on ceiling tile w/yellow glue
WLCER-21	6”x6” Yellow ceramic wall tile w/off-white grout and mortar
SINK-23	Stainless steel sink w/black undercoating
SINK-24	Black composite sink
12FLVCT/M-25	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
CARMAS-26	Yellow carpet glue under gray carpets
WLPL/CLPL-27	Off-white skimcoat over coarse gray wall and ceiling plaster
BBMAS-28	4”/6” Blue vinyl baseboard w/off-white glue
CLGL-29	12”x12” Off-white glued-on ceiling tile w/yellow and brown glue
WLCER-30	6”x6” Yellow ceramic wall tile w/off-white grout and mortar
FORMICA-31	Various colored formica counter top w/yellow glue
SINK-32	Stainless steel sink w/gray undercoating
WLPL/CLPL-33	Off-white textured skimcoat over coarse gray wall and ceiling plaster
WLPL/CLPL-34	Off-white skimcoat over coarse gray wall and ceiling plaster
CLGL-35	12”x12” Off-white nailed-on ceiling tile (some w/brown glue)
12FLVCT/M-36	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
WLPL/CLPL-37	Coarse off-white wall and ceiling plaster
BBMAS-38	4” Blue vinyl baseboard w/off-white glue
CLGL-39	12”x12” Off-white glued-on ceiling tile w/brown glue (some glued on walls)
CONC-40	Gray concrete stage
12FLVCT/M-41	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
BBMAS-43	4” Blue vinyl baseboard w/off-white glue
CLLI-44	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures
CLLI-45	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures (replacements)
CARMAS-46	Yellow carpet glue under gray carpets
12FLVCT/M-47	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
BBMAS-48	4” Blue vinyl baseboard w/off-white glue
FLCER-49	2”x1”/2”x2” Green/blue ceramic floor tile w/gray grout and mortar
WLPL/CLPL-50	Gray textured wall and ceiling plaster
WLCER-51	4”x4” Yellow/white ceramic wall tile w/off-white grout and gray mortar
CLTL-52	12”x12” Off-white nailed-on ceiling tile
BBMAS-54	4” Brown vinyl baseboard w/brown glue
CLGL-55	12”x12” Off-white glued-on ceiling tile w/brown glue
CLSP-56	12”x12” Off-white splined ceiling tile w/pinholes and fissures
12FLVCT/M-57	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
PAINT-58	Red/brown paint on concrete floors (some w/residual yellow carpet glue)
BBMAS-59	4”/6” Black/blue vinyl baseboard w/off-white glue
FORMCA-60	Various colored formica counter top w/yellow glue
SINK-61	Stainless steel sink w/black undercoating
12FLVCT/M-62	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
BBMAS-63	4” Blue vinyl baseboard w/off-white glue
CLLI-64	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures
PI-NNN1	Fiberglass insulation on pipes and fittings
WL-NNN2	Off-white painted wood wall and/or compressed board wall w/vinyl covering
PI-1	Yellow fiberglass insulation with plastic jacket and white silicone on pipe sticking out from slab
CLLI-2	2'x4' off-white laid-in ceiling tiles with pin hole
WL-3	4'x10' beige compressed wall panels with sheetrock base
WLPL/CLPL-4	Off-white painted wall/ceiling plaster
CARMAS-5	Blue/clear mastic with off-white leveling compound on concrete underneath blue/tan/red carpet
FLVCT-6	12"x12" light blue vinyl floor tiles with yellow mastic on concrete
BBMAS-7	Beige mastic over brown mastic behind 4" blue vinyl baseboard
WLSH/CLSH-8	Off-white painted wall sheetrock with tape and joint compound (concealed by compressed wall panels (WL-3) at perimeter walls of classrooms, and covered with wall

Material ID	Non-Asbestos Materials Description
	paper in offices)
CAULK-9	Off-white caulking on equipment, duct and conduit
CLGL-10	12"x12" off-white with fissures glued-on ceiling tiles with yellow mastic
CL-11	12"x12" off-white with pin hole nailed-on ceiling tiles
CL-12	12"x12" off-white with fissures nailed-on ceiling tiles
BBMAS-13	Beige/brown mastic behind 4" & 6" blue vinyl baseboard
FLVCT-14	12"x12" blue vinyl floor tiles with yellow mastic and gray leveling compound on concrete (Corridor West and Middle, E02, E03, E05, E06, E11, E13 and E15)
FLVCT-15	12"x12" blue vinyl floor tiles with black mastic and gray leveling compound on concrete (Corridor East, E04, E07, E08, E09, E10, E12, E14, E16, E17, E18, E19, E20, E21 and E22)
WLCER-16	4"x4" off-white/gray ceramic wall tiles with tan glue and gray grout
FLCER-17	2"x2" gray ceramic floor tiles with gray grout and mortar
CLGL-18	2'x4' off-white glued-on/nailed-on ceiling tiles with 12"x12" square pattern
WLSH-19	Wall sheetrock with tape and joint compound
WLPL/CLPL-20	Off-white painted wall/ceiling plaster with skimcoat
WLPL/CLPL-21	Off-white painted coarse wall/ceiling plaster on sheetrock base
CAULK-22	Gray caulking around exterior window frames and louver
WLCER-23	6"x6" yellow ceramic wall tiles with white grout

NNN = Non-Asbestos

5.3 Lead-Based Paints

Lead-based paints (LBP) or building materials with high lead content, as defined by U.S. Department of Housing and Urban Development (HUD), were identified and are as follows:

Building G:

- Blue paint on structural steel in gym [SCA Sample I.D. BL-7 with 55,000 ppm (5.5%)].

Building F:

- Off-white paint on door frame [SCA Sample I.D. OW-2 with 35,000 ppm].

Most site paints were found to be below the HUD LBP criteria, although dust control procedures are required throughout the demolition of painted elements to comply with the Cal/OSHA regulations under 8 CCR 1532.1. All site paints require dust control procedures in compliance with 8 CCR 1532.1.

Loose and peeling paints should be removed under controlled procedures prior to any demolition of the structure. None of the applicable regulations require removal of LBP prior to demolition or renovation if the paints are securely adhered to the substrates (i.e., non-flaking or non-peeling). Disposal of the demolition debris in this case can be handled as non-hazardous and non-RCRA waste after the loose and flaking paints have been removed, as long as demolition practices do not compromise worker safety.

Conventional demolition techniques should be employed for all painted surfaces with the Contractor complying with applicable OSHA and Cal/OSHA statutes regarding:

- Worker awareness training;
- Exposure monitoring, as needed;
- Medical examinations, including blood lead level testing; and
- Establishing a written respiratory protection program.

5.4 Polychlorinated Biphenyls

All fluorescent fixtures within the buildings should be treated as having suspect PCB ballasts, which will require recycling or disposal as a hazardous waste.

5.5 Mercury

Mercury-containing devices present at the site requiring disposal as universal or hazardous waste include the following, as applicable:

- Lamps, including fluorescent tubes and bulbs, high intensity discharge lamps, sodium vapor lamps, and any type of lamp that exhibits a characteristic of a hazardous waste; and
- Mercury thermometers and thermostats.

Any of the above devices impacted by renovation or demolition activities require disposal as universal waste. Universal wastes may not be disposed of in a municipal landfill or a non-hazardous waste recycling center, and may only be disposed of at an authorized recycling center or universal waste consolidator. If these devices are not recycled, they must be treated and handled as hazardous waste, which includes notification to DTSC using a waste manifest and a registered hazardous waste hauler. Rules to follow for households and small quantity generators are outlined in Title 22, Sections 66273.10 through 66273.21.

Universal wastes may not be stored on-site for longer than one year after accepting or generating the waste. Devices shall be packaged and labeled as "Universal Waste." Cleanup of any releases, such as broken fluorescent lamps, shall be repackaged and handled as universal waste, including contaminated soils, etc. Workers handling universal waste and responding to releases shall be trained with written instructions and postings within the building. Universal wastes in small quantities may be transported in personal vehicles, but records of all shipments must be maintained for a period of 3 years. Small quantity generators are limited to 100 kilograms (or 220 pounds) per month or less than 1 kilogram (or 2.2 pounds) of acutely hazardous waste indentified in Title 22, Chapter 11.

The U.S. Department of Transportation and California law dictates requirements for transportation, placards, etc. by registered hazardous waste transporters

5.6 Other Hazardous Materials

Common examples of universal wastes include televisions, computers, computer monitors, cell phones, telephones, printers, VCRs, portable DVD devices, non-empty aerosol cans, and batteries. Spent automotive-type batteries are not classified as universal waste. While universal wastes pose a lower risk to people than other hazardous waste, the California Code of Regulations, Title 22, Division 4.5, Chapter 23 provides rules for their safe handling and disposal.

Any of the above devices impacted by renovation or demolition activities require disposal as universal waste. Universal wastes may not be disposed of in a municipal landfill or a non-hazardous waste recycling center, and may only be disposed of at an authorized recycling center or universal waste consolidator. If these devices are not recycled, they must be treated and handled as hazardous waste.

Chemicals and systems that would be classified as hazardous waste requiring removal and disposal and/or recycling include, but are not necessarily limited to the following:

- Miscellaneous monitors, computers, printers, copiers and electronic equipment.
- Miscellaneous lab chemicals.
- Miscellaneous janitorial supplies and paints.
- Exit sign battery packs;

Note that all buildings are in active use and contain equipment and supplies which will need to be removed and temporarily stored throughout the renovation period.

6.0 Limitations and Exclusions

SCA warrants that this survey was performed using due care and state of the art techniques. Beyond this, SCA does not warrant or guarantee the survey. Despite the care exercised, some materials may not have been identified, or may have been incompletely identified. This condition may occur due to renovations or original construction practices that concealed older materials, and/or visually similar materials with different compositions.

This document is not a stand-alone document; abatement of materials is recommended to be completed under the oversight and design of an AHERA-accredited Project Designer and Certified Asbestos Consultant. Although due care is exercised in the course of the survey, concealed materials may be found in the course of performing the abatement or demolition; a contingency budget should be included in any cost estimates to cover unexpected conditions.

Table 1: Materials Matrix Report-HUSD, Tennyson High School, 27035 Whitman Street, Hayward, CA 94544

Material ID	Material Description	Sub-sample # 1	2	3	4	5	6	7	8	9	Asbestos: Positive, Assumed, Trace, Negative.	UNITS (LF, SF, EA)	Building A: Conference A02A	Special Ed Classroom A01/A03A	Staff Lounge A04//A04A	Special Ed Classroom A05/A05A/A05B	Custodial A06	Building B: Classrooms B03, B04, B05, B06, B07, B08	Snackroom B09 (Not accessible)	Exterior	Building C: Girls RR C00A	Boys RR C00B	Classrooms C01, C03, C07, C09, C11	Corridor C00	Classrooms C02, C04, C06, C08, C10, C12	Building D: Classrooms D01, D02, D05A, D07, D09, D11, D13, D15	Corridor D00	Classrooms D02, D4, D06, D08, D10, D12, D14, D16	Building L: Reading Rm	N Offices	E Offices	Stacks	Building M: Mens RR M04	Band Rm M14	Choral Rm M13	Hallway M15	Practice Rm M15A/M15B	Storage M14A	Office M14B	Closet M14C	Building O: Main Office O33	AP Office O20	Proc O13
ASBESTOS																																								
SINK-6	Stainless steel sink w/black undercoating	8% CH	ND								Positive	EA			1	1																								
9FLVCT/M-22	9"x9" Green vinyl floor tile (+) w/black mastic (-)	10% CH	8% CH									SF											20																	
CARMAS-42	Tan carpet glue (+)/black mastic (-) under gray carpets	3% CH	6% CH									SF																	1754	968	1884									
9FLVCT/M-53	9"x9" Tan w/brown streaks vinyl floor tile (+) w/black mastic (-)	8% CH	ND	<1% CH								SF																											
ASSUMED ASBESTOS (Destructive Testing Required to Confirm)																																								
FL-AAA1	Felt under hardwood floors										Assumed	SF						300																						
FIREDOOR-AA	Fire-rated core in 20-min fire doors											EA											5		6	8		8				1								1
VAPBAR-AAA3	Waterproofing membrane and/or vapor barrier below floor finishes											SF																											
NON-ASBESTOS																																							
12FLVCT/M-1	12"x12" Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound	ND	ND	ND								SF	15	360	140	80																							
WLSH/CLSH-2	Wall and ceiling sheetrock w/tape and join compound	ND	ND	ND								SF	100	360		160																							
BBMAS-3	4"/6" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF	15	90	70	40																							
FORMICA-4	Various colored formica counter top w/yellow glue	ND	ND									SF	10	180	140	80																							
SINK-5	Stainless steel sink w/gray undercoating	ND	ND									EA	1																										
FIREDOOR-7	Off-white core in firedoors	ND	ND									EA	1	1	1	1	1																						
WLPL/CLPL-8	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND								SF			280																								
12FLVCT/M-9	12"x12" Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound	ND	ND									SF						80																				
12FLVCT/M-10	12"x12" Off-white w/black streaks vinyl floor tile w/yellow glue over 12FLVCT/M-9	ND	ND									SF						20																				
CARMAS-11	Blue/yellow carpet glue under gray carpets (all over 12FLVCT/M-9)	ND	ND									SF						40																				
WLPL/CLPL-12	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND								SF						600																				
BBMAS-13	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF						60																				
CONC-14	Gray concrete sidewalk	ND	ND	ND								SF								120																		
12FLVCT/M-15	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF											860		840													
WLPL/CLPL-16	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND	ND	ND						SF									50	50	900	580	1000													
BBMAS-17	4"/6" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF											460	50	430													
FORMICA-18	Black/gray formica counter top w/yellow glue	ND	ND	ND								SF											860		810													
SINK-19	Stainless steel sink w/gray undercoating	ND	ND									EA											3															
CLGL-20	12"x12" Off-white glued-on ceiling tile w/yellow glue	ND	ND									SF									20	20		300														
WLCER-21	6"x6" Yellow ceramic wall tile w/off-white grout and mortar	ND	ND									SF												300														
SINK-23	Stainless steel sink w/black undercoating	ND	ND									EA											6		1													
SINK-24	Black composite sink	ND	ND									EA											9		15													
12FLVCT/M-25	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF														430		290											
CARMAS-26	Yellow carpet glue under gray carpets	ND	ND									SF																40											
WLPL/CLPL-27	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND	ND	ND						SF														1000		1000											
BBMAS-28	4"/6" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF														370	50	180											
CLGL-29	12"x12" Off-white glued-on ceiling tile w/yellow and brown glue	ND	ND									SF															300											
WLCER-30	6"x6" Yellow ceramic wall tile w/off-white grout and mortar	ND	ND									SF															300											
FORMICA-31	Various colored formica counter top w/yellow glue	ND	ND									SF														430		300											
SINK-32	Stainless steel sink w/gray undercoating	ND	ND									EA																1											
WLPL/CLPL-33	Off-white textured skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND							Negative	SF														500													
WLPL/CLPL-34	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND								SF																	150										
CLGL-35	12"x12" Off-white nailed-on ceiling tile (some w/brown glue)	ND	ND	ND								SF																	2149	2134	968								
12FLVCT/M-36	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF																				1700	1255	10	60	20	20	20			
WLPL/CLPL-37	Coarse off-white wall and ceiling plaster	ND	ND	ND								SF																						90	240	80	80	80			
BBMAS-38	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																				180	185	10	30	10	10	10			
CLGL-39	12"x12" Off-white glued-on ceiling tile w/brown glue (some glued on walls)	ND	ND	ND								SF																				2160		20	100	40	40	40			
CONC-40	Gray concrete stage	ND	ND									SF																					120								
12FLVCT/M-41	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF																	380										
BBMAS-43	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																	570	200	220								
CLLI-44	2'x4' Off-white laid-in ceiling tile w/pinholes and fissures	ND	ND									SF																			1836									
CLLI-45	2'x4' Off-white laid-in ceiling tile w/pinholes and fissures (replacements)	ND	ND									SF																			48									
CARMAS-46	Yellow carpet glue under gray carpets	ND	ND									SF																										462	384	
12FLVCT/M-47	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND									SF																										100		
BBMAS-48	4" Blue vinyl baseboard w/off-white glue	ND	ND									LF																										120	100	
FLCER-49	2"x1"/2"x2" Green/blue ceramic floor tile w/gray grout and mortar	ND	ND									SF																												
WLPL/CLPL-50	Gray textured wall and ceiling plaster	ND	ND	ND	ND	ND	ND	ND				SF																												
WLCER-51	4"x4" Yellow/white ceramic wall tile w/off-white grout and gray mortar	ND	ND									SF																												
CLTL-52	12"x12" Off-white nailed-on ceiling tile	ND	ND									SF																												
BBMAS-54	4" Brown vinyl baseboard w/brown glue	ND	ND									LF																												
CLGL-55	12"x12" Off-white glued-on ceiling tile w/brown glue	ND	ND									SF																												
CLSP-56	12"x12" Off-white splined ceiling tile w/pinholes and fissures	ND	ND									SF																												
12FLVCT/M-57	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF																												
PAINT-58	Red/brown paint on concrete floors (some w/residual yellow carpet glue)	ND	ND	ND								SF																												
BBMAS-59	4"/6" Black/blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																												
FORMCA-60	Various colored formica counter top w/yellow glue	ND	ND									SF																												
SINK-61	Stainless steel sink w/black undercoating	ND	ND									EA																												
12FLVCT/M-62	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND	ND							SF																												
BBMAS-63	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND	ND							LF																												
CLLI-64	2'x4' Off-white laid-in ceiling tile w/pinholes and fissures	ND	ND	ND	ND							SF																												
PI-NNN1	Fiberglass insulation on pipes and fittings										Not Suspect	LF																												
WL-NNN2	Off-white painted wood wall and/or compressed board wall w/vinyl covering											SF																												

Table 1: Materials Matrix Report-HUSD, Tennyson High School, 27035 Whitman Street, Hayward, CA 94544		Sub-sample #											Building A					Building B			Building C					Building D			Building L				Building M								Building O		
Material ID	Material Description	1	2	3	4	5	6	7	8	9	Asbestos: Positive, Assumed, Trace, Negative.	UNITS (LF, SF, EA)	Conference A02A	Special Ed Classroom A03A/A03A	Staff Lounge A04/A04A	Special Ed Classroom A05A/A05A/A05B	Custodial A06	Classrooms B03, B04, B05, B06, B07, B08a	Smackroom B09 (Not accessible)	Exterior	Girls RR C00A	Boys RR C00B	Classrooms C01, C03, C07, C09, C11	Cooridor C00	Classrooms C02, C04, C06, C08, C10, C12	Classrooms D01, D03, D05A, D07, D09, D11, D13, D15	Corridor D00	Classrooms D02, D4, D06, D08, D10, D12, D14, D16	Reading Rm	N Offices	E Offices	Stacks	Mens RR M04	Band Rm M14	Choral Rm M13	Hallway M15	Practice Rm M15A/M15B	Storage M14A	Office M14B	Closet M14C	Main Office O33	AP Office O20	Proc O13
PCBs											**PPM**																																
PCBs	PCB-Ballasts (assumed >50 ppm)										Assumed, >50	EA	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ
LEAD											**PPM (%)**																																
OW-1	Off-white paint on walls and ceilings										**83 (0.0083)**	SF	PNQ	PNQ	PNQ	PNQ	PNQ																										
BL-2	Blue/gray paint on doors/door frames										<38 (<0.0038)	SF	PNQ	PNQ	PNQ	PNQ	PNQ																										
OW-3	Off-white paint on walls and ceilings										<49 (<0.0049)	SF						PNQ	PNQ																								
OW-4	Off-white paint on walls and ceilings										**83 (0.0083)**	SF									PNQ	PNQ	PNQ	PNQ	PNQ																		
WLCER-21	6"x6" Yellow ceramic wall tile w/off-white grout and mortar										**1100 (0.11)**	SF												300																		
OW-5	Off-white paint on walls and ceilings										<50 (<0.0050)	SF														PNQ	PNQ	PNQ														
WLCER-30	6"x6" Yellow ceramic wall tile w/off-white grout and mortar										**3400 (0.34)**	SF															300															
OW-6	Off-white paint on walls and ceilings										**1300 (0.13)**	SF																													PNQ	PNQ	PNQ
BL-7	Blue paint on structural steel										**55,000 (5.5)**	SF																															
BE-8	Beige/gray paint on walls and ceilings										**780 (0.078)**	SF																															
RD-9	Red/brown paint on concrete floors										**1100 (0.11)**	SF																															
OW-10	Off-white paint on walls and ceilings										<46 (0.0046)	SF																															
BL-11	Blue/gray paint on doors/door frames										120 (0.012)	SF																															
Lead in paints	Lead Containing Paints / Coatings (assumed >1000ppm)										Assumed, >1000	SF	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ
Lead on steel	Lead Containing Coatings on Structural Steel (assumed >1000ppm)										Assumed, >1000	SF																															
Other Hazardous Materials																																										
Mercury	Fluorescent Light Tubes											EA	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ

Notes:
PNQ = Present, not quantified; CH = Chrysotile; ND = Not detected; NA = Not analyzed
(a) Quantities listed above are amounts expected to be impacted by upcoming renovations, and may not be representative of all quantities in space/room.

Table 1: Materials Matrix Report-HUSD, Tennyson High School, 27035 Whitman Street, Hayward, CA 94544		Sub-sample #											Building G							Building P					Building S							
Material ID	Material Description	1	2	3	4	5	6	7	8	9	Asbestos: Positive, Assumed, Trace, Negative.	UNITS (LF, SF, EA)	Boys Locker Rm G11N	Gymnasium G01	Wt Rm Entry G02	Weight Rm G03	Girls Locker Rm G11S	Dance Studio G09S	Halls G18N, G18S, G06S	Classrooms P01, P03, P05, P07, P09, P11	Classrooms P13, P15, P17, P19, P21	Classrooms P02, P04, P06, P08, P10, P12	Classrooms P14, P16, P18, P20, P22	Leadership Rm S01	3D Design S02	Ceramics S04	Classroom S05	Book Storage S06	Book Storage B07	Art Gallery S08	TOTAL (+/-15%)
ASBESTOS																															
SINK-6	Stainless steel sink w/black undercoating	8% CH	ND									EA																			2
9FLVCT/M-22	9"x9" Green vinyl floor tile (+) w/black mastic (-)	10% CH	8% CH									SF																			20
CARMAS-42	Tan carpet glue (+)/black mastic (-) under gray carpets	3% CH	6% CH								Positive	SF																			4606
9FLVCT/M-53	9"x9" Tan w/brown streaks vinyl floor tile (+) w/black mastic (-)	8% CH	ND	<1% CH								SF			180																180
ASSUMED ASBESTOS (Destructive Testing Required to Confirm)																															
FL-AAA1	Felt under hardwood floors											SF		13240		2631		1025													17196
FIREDOOR-AA	Fire-rated core in 20-min fire doors										Assumed	EA																			29
VAPBAR-AAA3	Waterproofing membrane and/or vapor barrier below floor finishes											SF	5000				5000														10000
NON-ASBESTOS																															
12FLVCT/M-1	12"x12" Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound	ND	ND	ND								SF																			595
WLSH/CLSH-2	Wall and ceiling sheetrock w/tape and join compound	ND	ND	ND								SF																			620
BBMAS-3	4"/6" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																			215
FORMICA-4	Various colored formica counter top w/yellow glue	ND	ND									SF																			410
SINK-5	Stainless steel sink w/gray undercoating	ND	ND									EA																			1
FIREDOOR-7	Off-white core in firedoors	ND	ND									EA																			5
WLPL/CLPL-8	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND								SF																			280
12FLVCT/M-9	12"x12" Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound	ND	ND									SF																			80
12FLVCT/M-10	12"x12" Off-white w/black streaks vinyl floor tile w/yellow glue over 12FLVCT/M-9	ND	ND									SF																			20
CARMAS-11	Blue/yellow carpet glue under gray carpets (all over 12FLVCT/M-9)	ND	ND									SF																			40
WLPL/CLPL-12	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND								SF																			600
BBMAS-13	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																			60
CONC-14	Gray concrete sidewalk	ND	ND	ND								SF																			120
12FLVCT/M-15	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF																			1700
WLPL/CLPL-16	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND	ND	ND						SF																			2580
BBMAS-17	4"/6" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																			940
FORMICA-18	Black/gray formica counter top w/yellow glue	ND	ND	ND								SF																			1670
SINK-19	Stainless steel sink w/gray undercoating	ND	ND									EA																			3
CLGL-20	12"x12" Off-white glued-on ceiling tile w/yellow glue	ND	ND									SF																			340
WLCER-21	6"x6" Yellow ceramic wall tile w/off-white grout and mortar	ND	ND									SF																			300
SINK-23	Stainless steel sink w/black undercoating	ND	ND									EA																			7
SINK-24	Black composite sink	ND	ND									EA																			24
12FLVCT/M-25	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF																			720
CARMAS-26	Yellow carpet glue under gray carpets	ND	ND									SF																			40
WLPL/CLPL-27	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND	ND	ND						SF																			2000
BBMAS-28	4"/6" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																			600
CLGL-29	12"x12" Off-white glued-on ceiling tile w/yellow and brown glue	ND	ND									SF																			300
WLCER-30	6"x6" Yellow ceramic wall tile w/off-white grout and mortar	ND	ND									SF																			300
FORMICA-31	Various colored formica counter top w/yellow glue	ND	ND									SF																			730
SINK-32	Stainless steel sink w/gray undercoating	ND	ND									EA																			1
WLPL/CLPL-33	Off-white textured skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND							Negative	SF																			500
WLPL/CLPL-34	Off-white skimcoat over coarse gray wall and ceiling plaster	ND	ND	ND								SF																			150
CLGL-35	12"x12" Off-white nailed-on ceiling tile (some w/brown glue)	ND	ND	ND								SF																			5251
12FLVCT/M-36	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF																			3085
WLPL/CLPL-37	Coarse off-white wall and ceiling plaster	ND	ND	ND								SF																			570
BBMAS-38	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																			435
CLGL-39	12"x12" Off-white glued-on ceiling tile w/brown glue (some glued on walls)	ND	ND	ND								SF																			2400
CONC-40	Gray concrete stage	ND	ND									SF																			120
12FLVCT/M-41	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF																			380
BBMAS-43	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND								LF																			990
CLLI-44	2'x4' Off-white laid-in ceiling tile w/pinholes and fissures	ND	ND									SF																			1836
CLLI-45	2'x4' Off-white laid-in ceiling tile w/pinholes and fissures (replacements)	ND	ND									SF																			48
CARMAS-46	Yellow carpet glue under gray carpets	ND	ND									SF																			846
12FLVCT/M-47	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND									SF																			100
BBMAS-48	4" Blue vinyl baseboard w/off-white glue	ND	ND									LF																			220
FLCER-49	2"x1"/2"x2" Green/blue ceramic floor tile w/gray grout and mortar	ND	ND									SF	5000				5000														10000
WLPL/CLPL-50	Gray textured wall and ceiling plaster	ND	ND	ND	ND	ND	ND	ND	ND			SF	8600			2631	8600	2705	1800												24336
WLCER-51	4"x4" Yellow/white ceramic wall tile w/off-white grout and gray mortar	ND	ND									SF	2500				2500		1800												6800
CLTL-52	12"x12" Off-white nailed-on ceiling tile	ND	ND									SF		13240																	13240
BBMAS-54	4" Brown vinyl baseboard w/brown glue	ND	ND									LF			60																60
CLGL-55	12"x12" Off-white glued-on ceiling tile w/brown glue	ND	ND									SF				2631															2631
CLSP-56	12"x12" Off-white splined ceiling tile w/pinholes and fissures	ND	ND									SF						1025	665												1690
12FLVCT/M-57	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND								SF												200	200		200	600	400	100	1700
PAINT-58	Red/brown paint on concrete floors (some w/residual yellow carpet glue)	ND	ND	ND								SF												200	200	400					800
BBMAS-59	4"/6" Black/blue vinyl baseboard w/off-white glue	ND	ND	ND								LF												80	80		100	300		40	600
FORMCA-60	Various colored formica counter top w/yellow glue	ND	ND									SF															200				200
SINK-61	Stainless steel sink w/black undercoating	ND	ND									EA															9				9
12FLVCT/M-62	12"x12" Blue w/white specks vinyl floor tile w/yellow glue	ND	ND	ND	ND							SF								6000	5000	6000	5000								22000
BBMAS-63	4" Blue vinyl baseboard w/off-white glue	ND	ND	ND	ND							LF								780	650	780	650								2860
CLLI-64	2'x4' Off-white laid-in ceiling tile w/pinholes and fissures	ND	ND	ND	ND							SF								6000	5000	6000	5000								22000
PI-NNN1	Fiberglass insulation on pipes and fittings										Not Suspect	LF	40				40														80
WL-NNN2	Off-white painted wood wall and/or compressed board wall w/vinyl covering											SF												200	200	300	300	200		200	1400

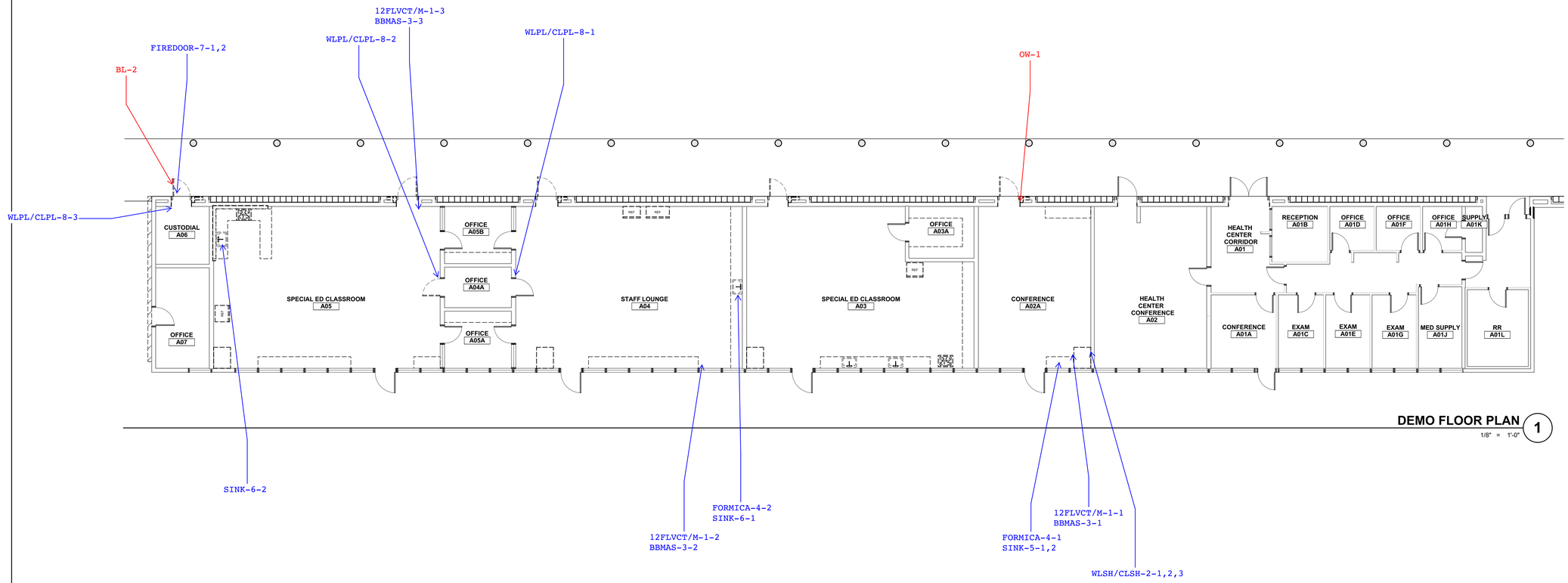
Table 1: Materials Matrix Report-HUSD, Tennyson High School, 27035 Whitman Street, Hayward, CA 94544		Sub-sample #											Building G							Building P				Building S							
Material ID	Material Description	1	2	3	4	5	6	7	8	9	Asbestos: Positive, Assumed, Trace, Negative.	UNITS (LF, SF, EA)	Boys Locker Rm G12N	Gymnasium G01	Wt Rm Entry G02	Weight Rm G03	Girls Locker Rm G11S	Dance Studio G09S	Halls G18N, G18S, G06S	Classrooms P01, P03, P05, P07, P09, P11	Classrooms P13, P15, P17, P19, P21	Classrooms P02, P04, P06, P08, P10, P12	Classrooms P14, P16, P18, P20, P22	Leadership Rm S01	3D Design S02	Ceramics S04	Classroom S05	Book Storage S06	Book Storage B07	Art Gallery S08	TOTAL (+/-15%)
PCBs											**PPM**																			
PCBs	PCB-Ballasts (assumed >50 ppm)										Assumed, >50	EA	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ
LEAD											**PPM (%)**																			
OW-1	Off-white paint on walls and ceilings										**83 (0.0083)**	SF																		PNQ
BL-2	Blue/gray paint on doors/door frames										<38 (<0.0038)	SF																		PNQ
OW-3	Off-white paint on walls and ceilings										<49 (<0.0049)	SF																		PNQ
OW-4	Off-white paint on walls and ceilings										**83 (0.0083)**	SF																		PNQ
WLCER-21	6"x6" Yellow ceramic wall tile w/off-white grout and mortar										**1100 (0.11)**	SF																		300
OW-5	Off-white paint on walls and ceilings										<50 (<0.0050)	SF																		PNQ
WLCER-30	6"x6" Yellow ceramic wall tile w/off-white grout and mortar										**3400 (0.34)**	SF																		300
OW-6	Off-white paint on walls and ceilings										**1300 (0.13)**	SF																		PNQ
BL-7	Blue paint on structural steel										**55,000 (5.5)**	SF		PNQ																PNQ
BE-8	Beige/gray paint on walls and ceilings										**780 (0.078)**	SF	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ											PNQ
RD-9	Red/brown paint on concrete floors										**1100 (0.11)**	SF																		PNQ
OW-10	Off-white paint on walls and ceilings										<46 (0.0046)	SF												PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ
BL-11	Blue/gray paint on doors/door frames										120 (0.012)	SF												PNQ		PNQ				PNQ
Lead in paints	Lead Containing Paints / Coatings (assumed >1000ppm)										Assumed, >1000	SF	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ
Lead on steel	Lead Containing Coatings on Structural Steel (assumed >1000ppm)										Assumed, >1000	SF		PNQ																PNQ
Other Hazardous Materials																														
Mercury	Fluorescent Light Tubes											EA	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ	PNQ

Notes:
PNQ = Present, not quantified; CH = Chrysotile; ND = Not detected; NA = Not analyzed
(a) Quantities listed above are amounts expected to be impacted by upcoming renovations, and may not be representative of all quantities in space/room.

Table 2: Materials Matrix Report- HUSD, Tennyson High School, Buildings C, E and F, 27035 Whitman Street, Hayward, CA 94544

Material ID	Material Description	Sub-sample # 1	2	3	4	5	6	7	Asbestos: Positive, Assumed, Trace, Negative.	UNITS (LF, SF, EA)	Building C: Classrooms C01, C03, C07, C09, C11	Building C: Classrooms C02, C04, C06, C08, C10, C12	Building E: Girls Restroom E00A	Building E: Boys Restroom E00B	Building E: Corridor E00	Building E: Classrooms E03, E07, E09, E13, E15, E19, E21	Building E: Counselor/Offices E05, E05A, E11, E11A, E17, E17A	Building E: Classrooms E04, E08, E10, E14, E16, E20, E22	Building E: Counselor/Offices E06, E06A, E12, E12A, E18, E18A	Building E: Storage E01 & Coustodial E02	Building E: Exterior	Building F: Classroom F15 & F16	Building F: Office F16A, F16B, F18A & F18B	Building F: Media Lab F17 & F18	Building F: Custodial F17A	Building F: Storage F17B (Not accessible)	Building F: Roof	Building F: Exterior	TOTAL (+/-15%)
ASSUMED ASBESTOS (Destructive Testing Required to Confirm)																													
FIREDOOR-AAA1	Fire-rated core in 45-min fire doors								**Assumed**	EA															2				2
VAPBAR-AAA2	Vapor barriers underneath floor finishes									SF			420	420															840
NON-ASBESTOS																													
PI-1	Yellow fiberglass insulation with plastic jacket and white silicone on pipe sticking out from slab	ND	ND							LF	10	10																	20
CLLI-2	2'x4' off-white laid-in ceiling tiles with pin hole	ND	ND							SF												1900	550	1800					4250
WL-3	4'x10' beige compressed wall panels with sheetrock base	ND	ND							SF												1300		1200					2500
WLPL/CLPL-4	Off-white painted wall/ceiling plaster	ND	ND	ND						SF															730				730
CARMAS-5	Blue/clear mastic with off-white leveling compound on concrete underneath blue/tan/red carpet	ND	ND							SF												1900		1800					3700
FLVCT-6	12"x12" light blue vinyl floor tiles with yellow mastic on concrete	ND	ND							SF													550						550
BBMAS-7	Beige mastic over brown mastic behind 4" blue vinyl baseboard	ND	ND							SF												40	70	30					140
WLSH/CLSH-8	Off-white painted wall sheetrock with tape and joint compound (concealed by compressed wall panels (WL-3) at perimeter walls of classrooms, and covered with wall paper in offices)	ND	ND	ND	ND	ND	ND	ND		SF												2400	2000	2200	120				6720
CAULK-9	Off-white caulking on equipment, duct and conduit	ND	ND							SF																	15		15
CLGL-10	12"x12" off-white with fissures glued-on ceiling tiles with yellow mastic	ND	ND							SF					3200														3200
CL-11	12"x12" off-white with pin hole nailed-on ceiling tiles	ND	ND							SF							320		320										640
CL-12	12"x12" off-white with fissures nailed-on ceiling tiles	ND	ND							SF			420	70		7000		7000											14490
BBMAS-13	Beige/brown mastic behind 4" & 6" blue vinyl baseboard	ND	ND	3					Negative	SF					250	280	80		80	20									710
FLVCT-14	12"x12" blue vinyl floor tiles with yellow mastic and gray leveling compound on concrete (Corridor West and Middle, E02, E03, E05, E06, E11, E13 and E15)	ND	ND							SF					2000	2520	540		270	90									5420
FLVCT-15	12"x12" blue vinyl floor tiles with black mastic and gray leveling compound on concrete (Corridor East, E04, E07, E08, E09, E10, E12, E14, E16, E17, E18, E19, E20, E21 and E22)	ND	ND							SF					1200	3360	270	5880	540										11250
WLCER-16	4"x4" off-white/gray ceramic wall tiles with tan glue and gray grout	ND	ND							SF			700	700															1400
FLCER-17	2"x2" gray ceramic floor tiles with gray grout and mortar	ND	ND							SF			420	420															840
CLGL-18	2'x4' off-white glued-on/nailed-on ceiling tiles with 12"x12" square pattern	ND	ND							SF				350															350
WLSH-19	Wall sheetrock with tape and joint compound	ND	ND	ND						SF			130	130															260
WLPL/CLPL-20	Off-white painted wall/ceiling plaster with skimcoat	ND	ND	ND	ND	ND				SF			1300	1300						800									3400
WLPL/CLPL-21	Off-white painted coarse wall/ceiling plaster on sheetrock base	ND	ND	ND	ND	ND	ND	ND		SF					8000	9800	3500	9800	3500										34600
CAULK-22	Gray caulking around exterior window frames and louver	ND	ND							LF											110								110
WLCER-23	6"x6" yellow ceramic wall tiles with white grout	ND	ND							SF					3300														3300
PCBs									**PPM**																				
PCBs	PCB-Ballasts (assumed >50 ppm)								Assumed, >50	EA			2	2	15	63	12	63	12			42	8	36					255
LEAD									**PPM**																				
BLUE-1	Blue paint over wall paper								<49	SF													PNQ						PNQ
OW-2	Off-white paint on door frame								**35,000**	SF																		PNQ	PNQ
OW-3	Off-white paint on equipment, duct and conduit								<49	SF																	PNQ		PNQ
OW-4	Off-white paint on walls/ceiling								**87**	SF					PNQ	PNQ	PNQ	PNQ	PNQ	PNQ									PNQ
WLCER-16	4"x4" off-white/gray ceramic wall tiles with tan glue and gray grout								<42	SF			700	700															1400
WLCER-23	6"x6" yellow ceramic wall tiles with white grout								**210**	SF					3300														3300
Lead in paints	Lead Containing Paints / Coatings (assumed >1000ppm)								Assumed, >1000	SF					PNQ	PNQ	PNQ	PNQ	PNQ	PNQ							PNQ	PNQ	PNQ
Other Hazardous Materials																													
Mercury	Fluorescent Light Tubes									EA			4	4	30	189	24	189	24			120	16	108					708

Notes:
PNQ = Present, not quantified; CH = Chrysotile; ND = Not detected; NA = Not analyzed



DEMO FLOOR PLAN 1

1/8" = 1'-0"

Figure 1. Sample Location Diagram
HUSD, Tennyson HS
Building A
SCA Proj. #: B-13490.02
April 12-14, 2022

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

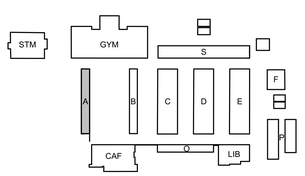
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE, DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: MARCH 15, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

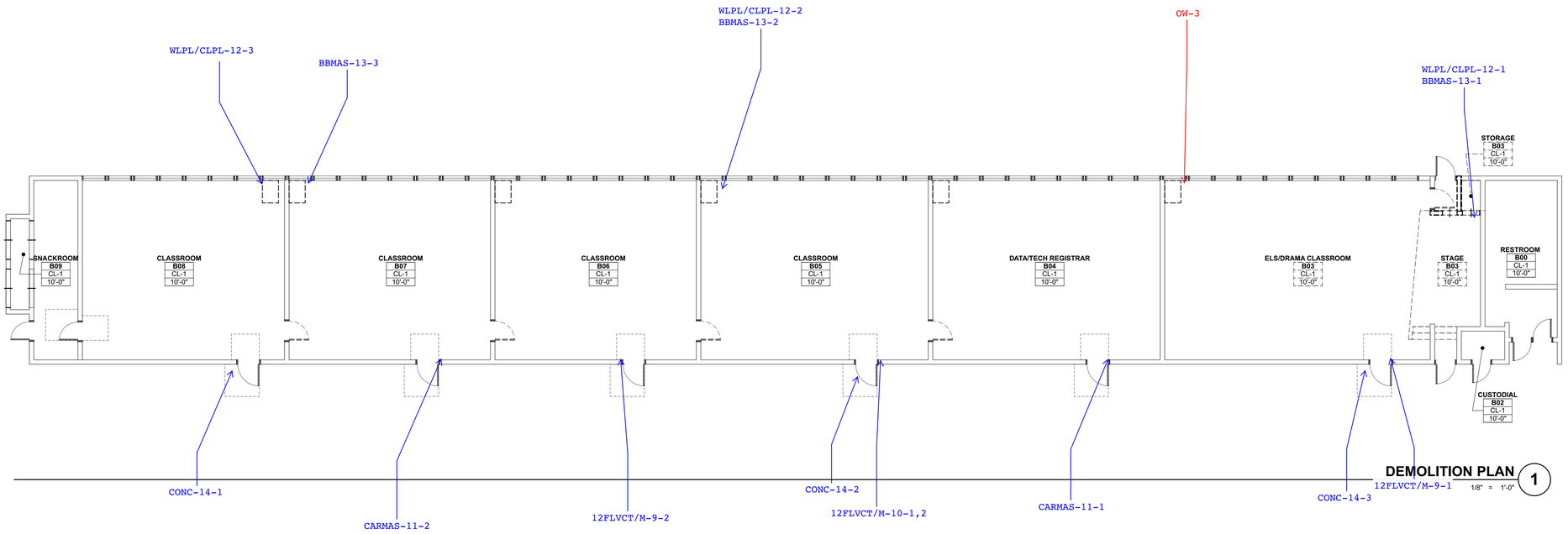
DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY:
DRAWING SCALE:
PTN: 61192-166 FILE NO: 1-H6
90% DESIGN DEV'T
MARCH 15, 2022
SHEET TITLE

BUILDING A DEMOLITION PLAN

SHEET NUMBER

A-A2.0

BIM360ud: BIMCLOUD-QKA - BIM/cloud/1910.00 Tennyson HS Mod/1910.00 THS Mod A SD24.3/14/2022 12:11 PM



DEMOLITION PLAN 1
1/8" = 1'-0"

Figure 2. Sample Location Diagram
HUSD, Tennyson HS
Building B
SCA Proj. #: B-13490.02
April 12-14, 2022

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

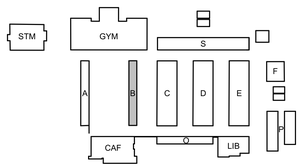
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE, DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.
24. REMOVE (E) TILE LEDGE

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: MARCH 15, 2022

TENNYSON HIGH SCHOOL

#Project Work

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119141

ARCH PROJECT NO: 1910.00
DRAWN BY:
DRAWING SCALE:
PTN: 61192-166 FILE NO: I-H6

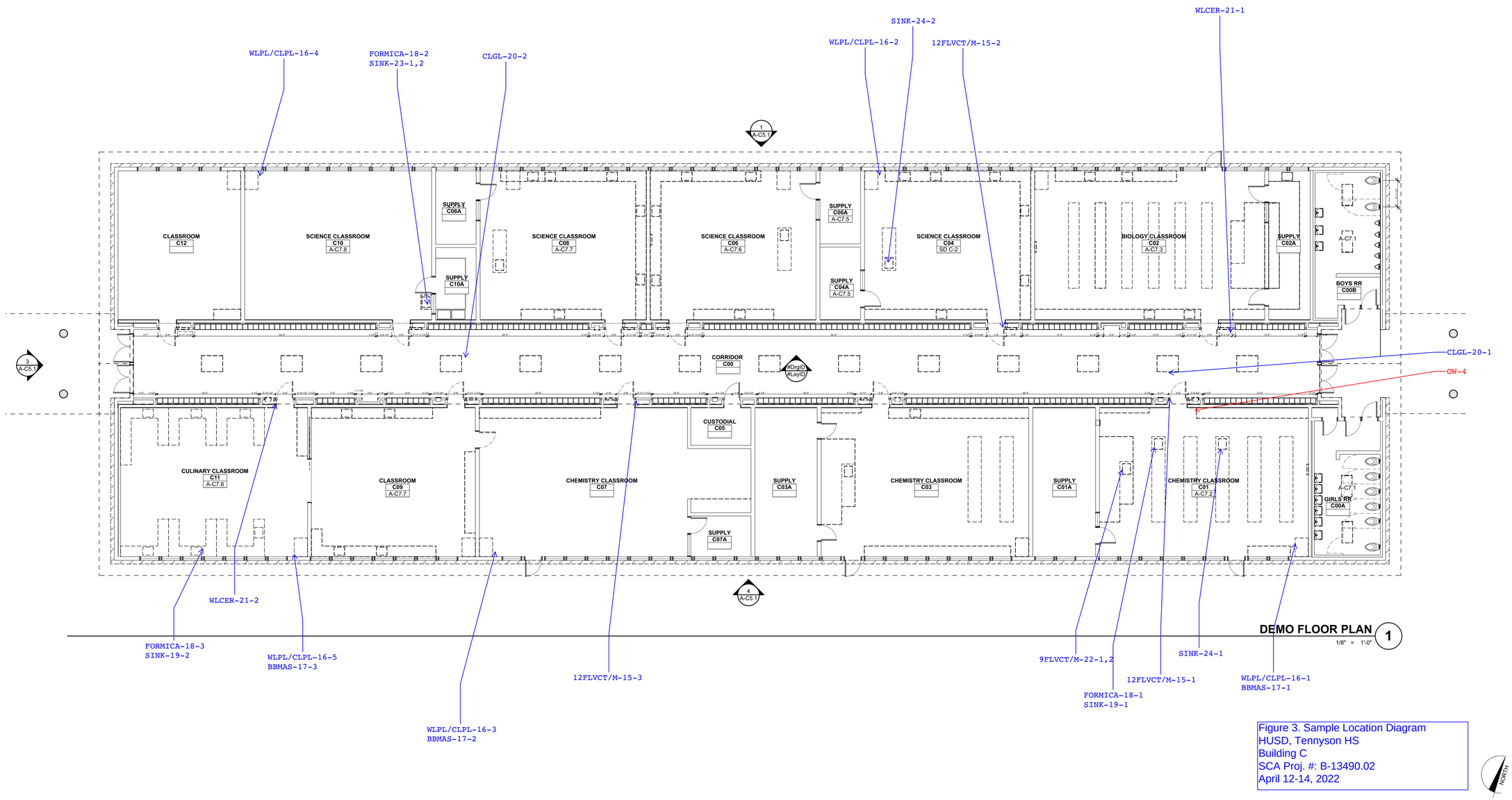
DESIGN DEVELOPMENT
MARCH 15, 2022
SHEET TITLE

BUILDING B DEMOLITION PLAN

SHEET NUMBER

A-B2.0

\\p2333-01\projectfiles\1910.00 - Tennyson HS Modern...HUSD\Drawings\02-SD\1910.00 Tennyson HS Mod B SD24.pln;3/14/2022;12:21 PM



DEMO FLOOR PLAN 1 — 1/8" = 1'-0"

Figure 3. Sample Location Diagram
HUSD, Tennyson HS
Building C
SCA Proj. #: B-13490.02
April 12-14, 2022

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

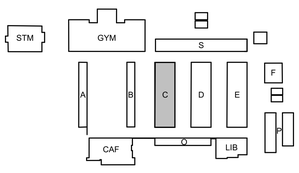
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE, DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.
24. REMOVE (E) TILE LEDGE

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
MARK QUATTROCCHI
LICENSE # C15438
EXP JULY 31, 2023
STATE OF CALIFORNIA

SIGNED: MARCH 15, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

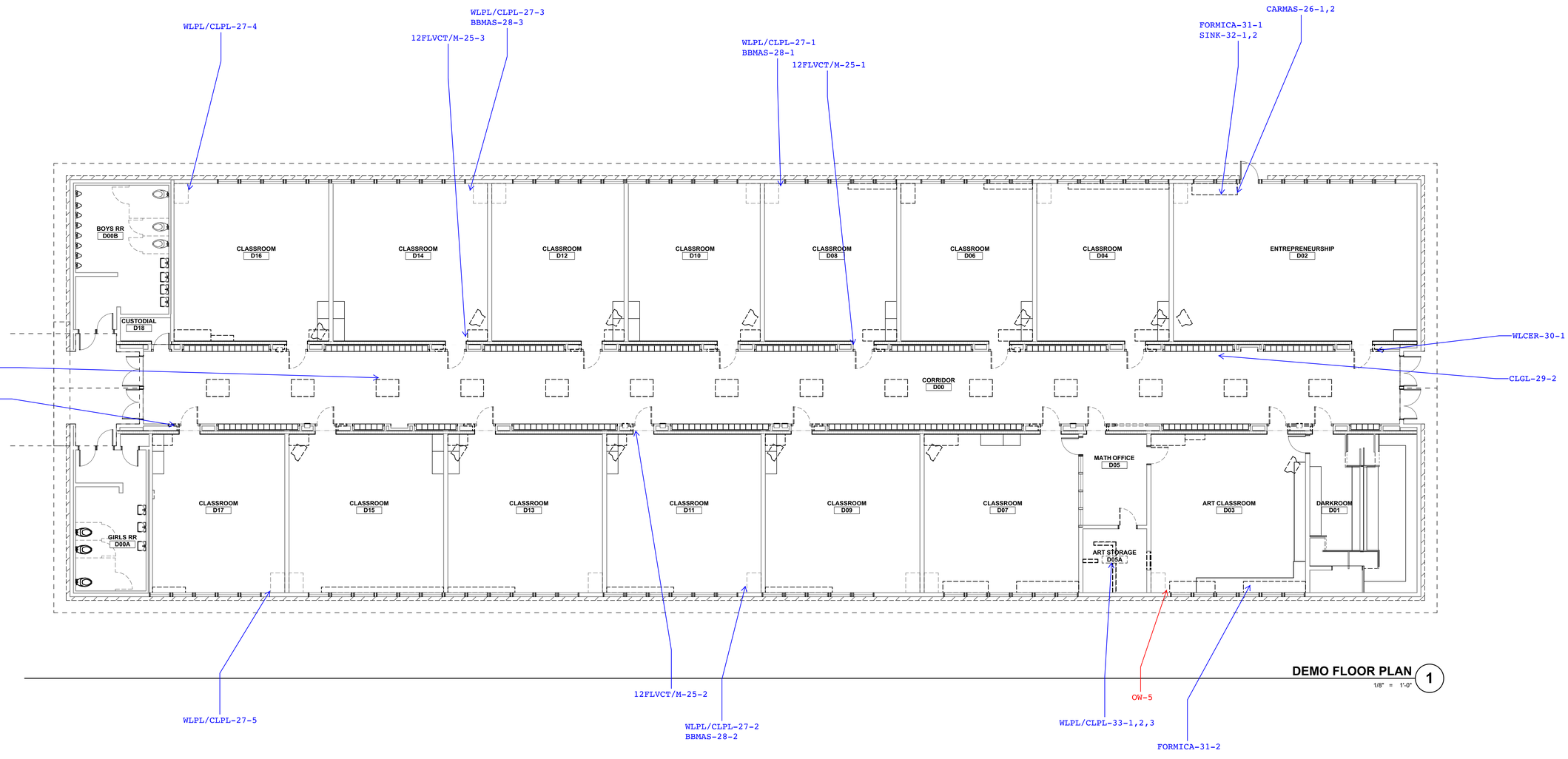
DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY:
DRAWING SCALE:
PTN: 61192-166 FILE NO: 1-H6
90% DESIGN DEV'T
MARCH 15, 2022
SHEET TITLE

BUILDING C DEMOLITION PLAN

SHEET NUMBER

A-C2.0

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod C SD24.3/14/2022 12:16 PM



DEMO FLOOR PLAN 1

1/8" = 1'-0"

Figure 4. Sample Location Diagram
HUSD, Tennyson HS
Building D
SCA Proj. #: B-13490.02
April 12-14, 2022

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

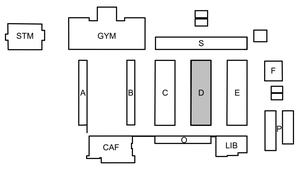
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE, DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.
24. REMOVE (E) TILE LEDGE

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: MARCH 15, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY: *fill out manualy ea sheet!*
DRAWING SCALE: 1/8" = 1'-0"
PTN: 61192-166 FILE NO: 1-H6
90% DESIGN DEV'T
MARCH 15, 2022
SHEET TITLE

BUILDING D DEMOLITION PLAN

SHEET NUMBER

A-D2.0

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod D SD24.3/14/2022 12:28 PM

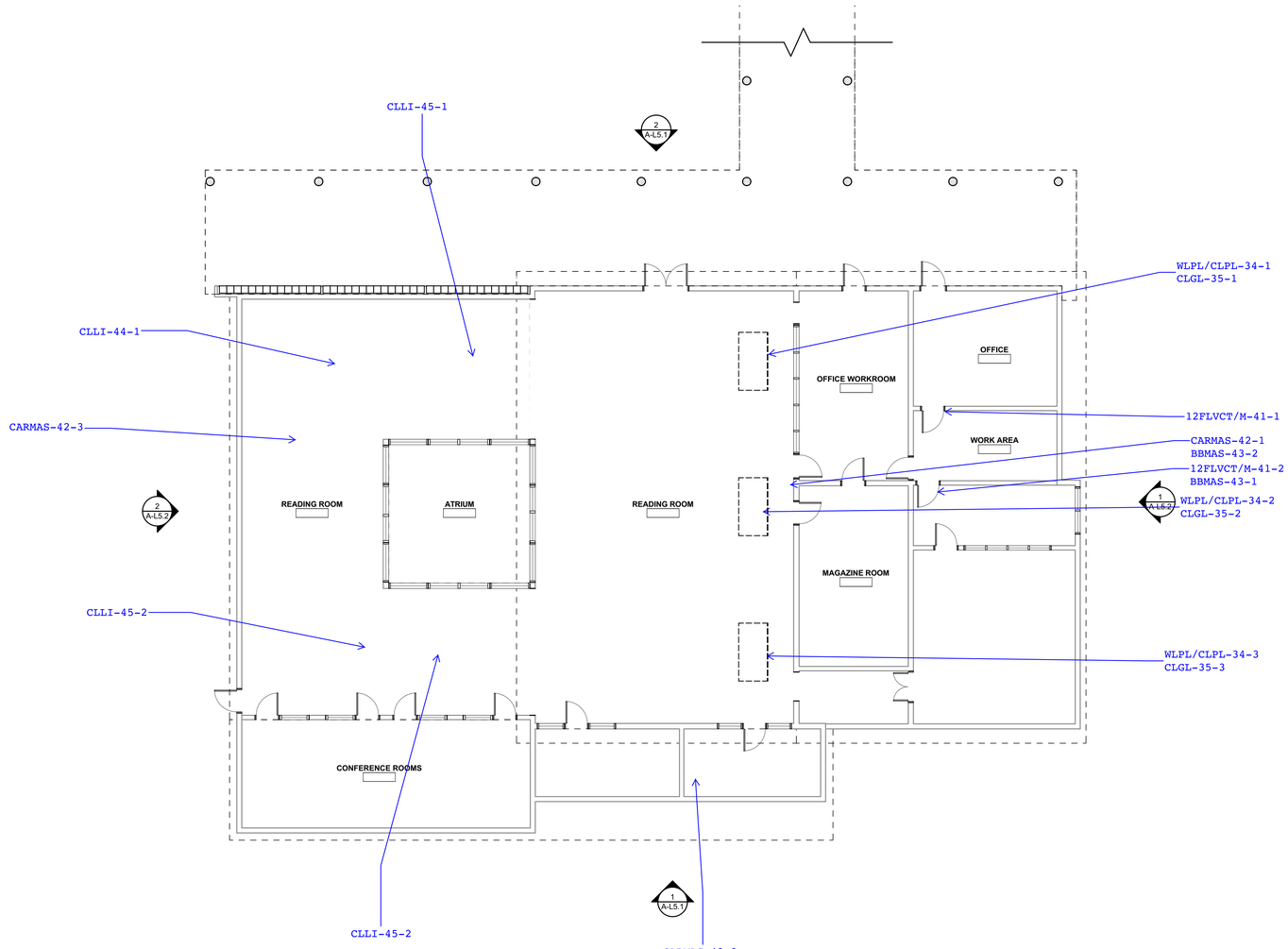


Figure 5. Sample Location Diagram
HUSD, Tennyson HS
Building L
SCA Proj. #: B-13490.02
April 12-14, 2022

DEMO FLOOR PLAN 1 — 1/8" = 1'-0"

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

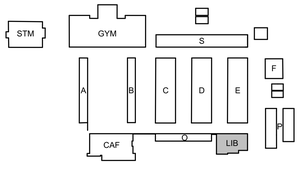
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILIENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK. (E-15)
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE, DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: OCTOBER 15, 2021

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 1

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

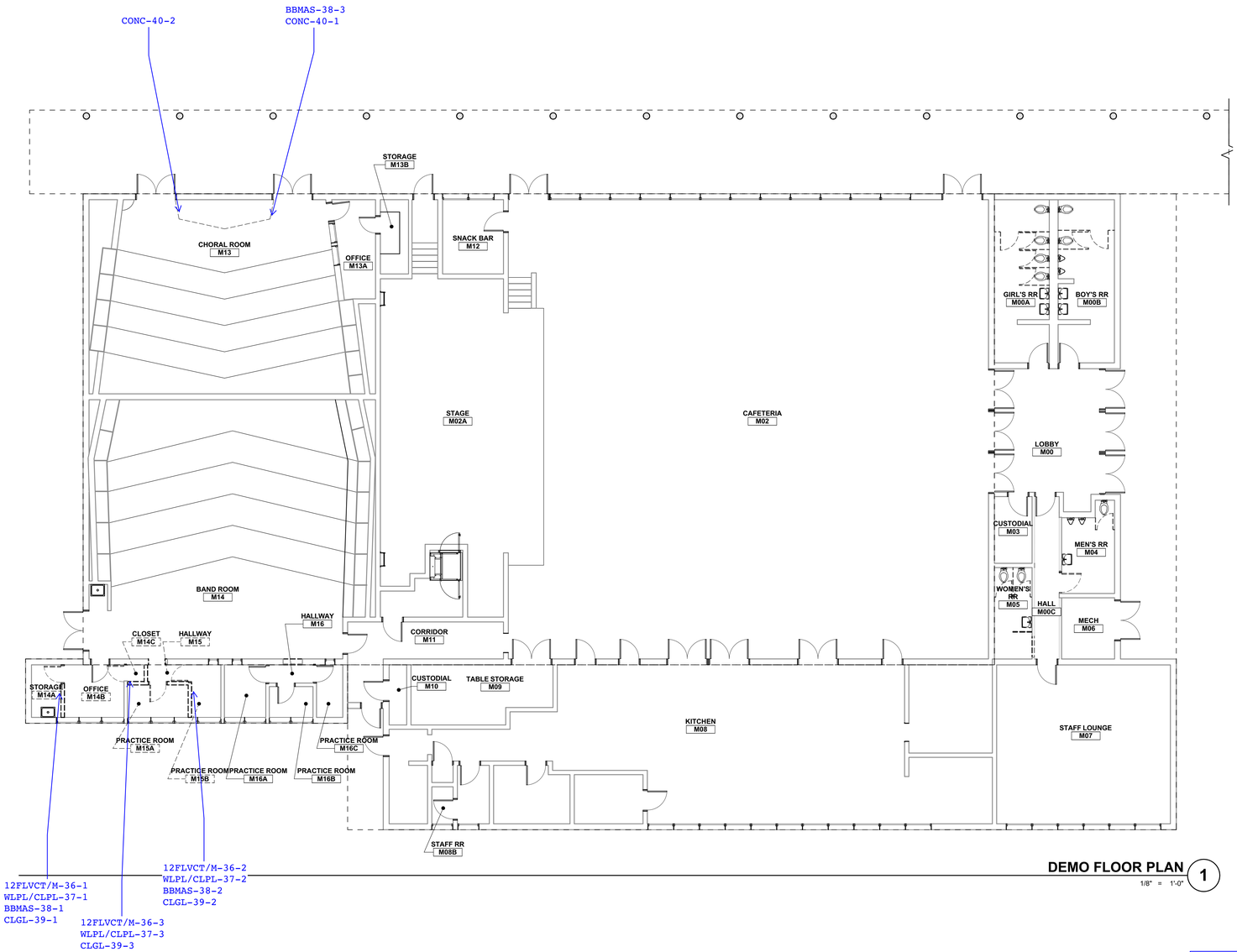
DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY:
DRAWING SCALE:
PTN: 61192-166 FILE NO: 1-H6
90% DESIGN DEV'T
OCTOBER 15, 2021
SHEET TITLE

BUILDING L DEMOLITION PLAN

SHEET NUMBER

A-L2.1

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod Libr SD24 3/14/2022 4:51 PM



DEMO FLOOR PLAN 1

1/8" = 1'-0"

Figure 6. Sample Location Diagram
HUSD, Tennyson HS
Building M
SCA Proj. #: B-13490.02
April 12-14, 2022

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

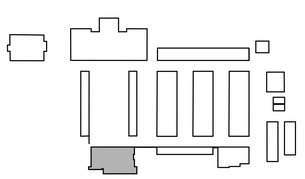
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK. (E-15).
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE. DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS. PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS. (VERIFY WITH DISTRICT)
17. REMOVE (E) DOOR HARDWARE AND DELIVER TO DISTRICT. (VERIFY WITH DISTRICT SCOPE OF WORK)
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF CONCRETE SAWCUT WORK. COORD W/ STRUCTURAL & PLUMBING DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: OCTOBER 15, 2021

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119941

ARCH PROJECT NO:	1910.00
DRAWN BY:	*fill out manualy ea sheet!*
DRAWING SCALE:	1/8" = 1'-0"
PTN: 61192-166	FILE NO: 1-H6

90% DESIGN DEV'T

OCTOBER 15, 2021

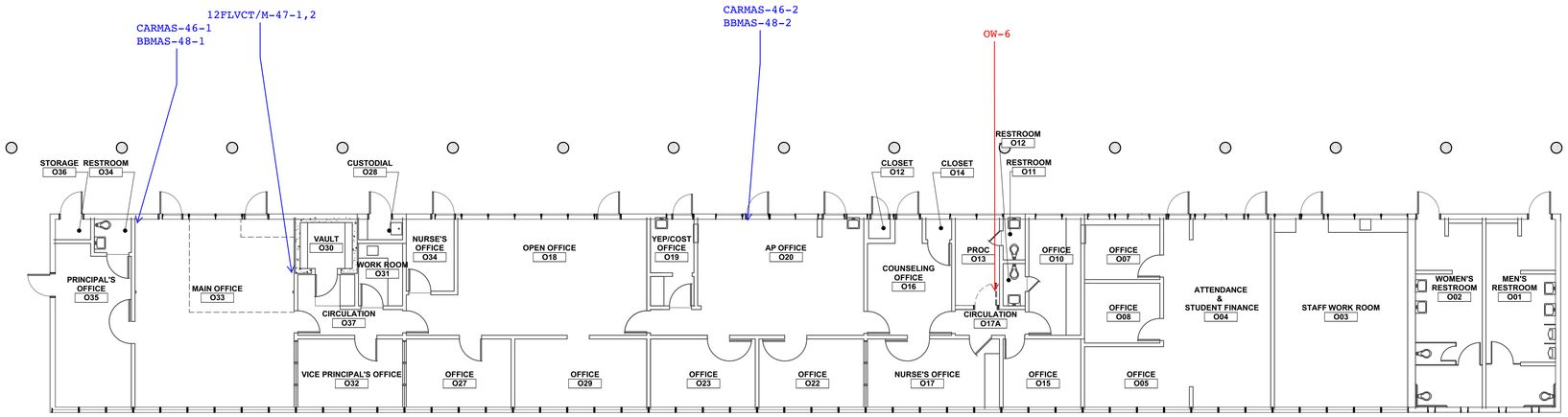
SHEET TITLE

BUILDING M DEMOLITION PLAN

SHEET NUMBER

A-M2.0

BIM360ud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod Cat SD24.3/14/2022 12:29 PM



FIRST FLOOR DEMOLITION PLAN 1

1/8" = 1'-0"

2 A-O5.1

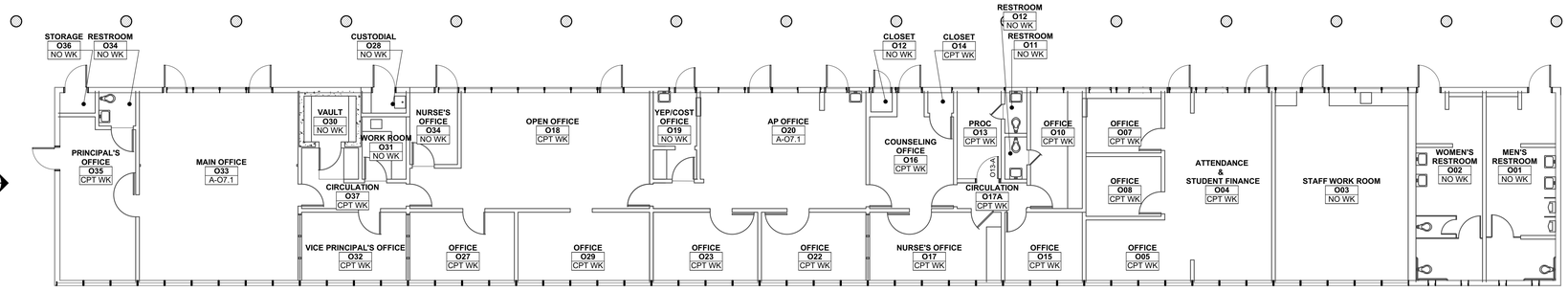


Figure 7. Sample Location Diagram
HUSD, Tennyson HS
Building O
SCA Proj. #: B-13490.02
April 12-14, 2022

FIRST FLOOR PLAN 2

1/8" = 1'-0"

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

- D1 REMOVE (E) DOOR, WINDOW, FRAME, TRIM, THRESHOLD & ASSOCIATED HARDWARE. PREPARE AREA FOR NEW WORK
- D2 REMOVE (E) FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
- D3 REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
- D4 REMOVE (E) FOLDING PARTITION & ASSOCIATED HARDWARE. PREPARE WALLS, FLOORS AND CEILING FOR NEW WORK
- D5 REMOVE (E) STAGE & ASSOCIATED HARDWARE. PREPARE WALLS AND FLOOR FOR NEW WORK
- D6 REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
- D7 REMOVE (E) 2x4 CEILING TILES AND GRID. PREPARE WALLS FOR NEW WORK.
- D8 REMOVE (E) ELECTRICAL SERVICE POLES. PREPARE FOR NEW ELECTRICAL WORK.

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE

FLOOR PLAN GENERAL NOTES

1. FOR SITE CONDITIONS SEE SITE PLAN SHEET A1.1
2. REFER TO SITE PLANS FOR SITE FEATURES NOT OTHERWISE INDICATED.
3. REFER TO SHEETS A-8.3 AND A-8.4 FOR SIGNAGE NOT SHOWN.
4. REFER TO REFLECTED CEILING PLAN FOR CLERESTORY WINDOWS.
5. ALL INTERIOR WALL FRAMING AND GYP.BD. EXTEND TO UNDERSIDE OF ROOF SHEATHING ABOVE, U.O.N.

FLOOR PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

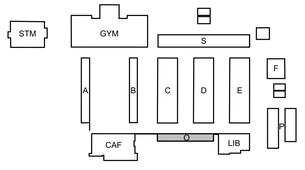
1. MECHANICAL ITEM, S.M.D.
2. PLUMBING ITEM / FIXTURE, TYP., S.P.D.
3. ELECTRICAL ITEM, S.E.D.
4. INSTALL MARKERBOARD METAL PANELS, SEE 22/A-10.1 & INTERIOR ELEVATIONS
5. INFILL (E) WALL TO MATCH IN THICKNESS, TEXTURE & FINISH, PAINT. SEE 9/A-9.1
6. INSTALL CASEWORK WITH BLOCKING, SEE 3/A-10.3
7. INSTALL SEMI-RECESSED FIRE EXTINGUISHER CABINET, SEE 15/A-10.1 (FE CLASS ABC, UL 3-A,40-B:C)

WALL TYPE LEGEND

S.S.D. FOR WOOD FRAMING SIZES

- (E) WOOD FRAMING - NON RATED
- WOOD FRAMING - NON RATED, S.S.D.
- 45 ACOUSTIC RATING (STC). SEE SHEET A-9.1 FOR ACOUSTIC WALL DETAILS.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: DECEMBER 17, 2021

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY: *fill out manualy ea sheet!*
DRAWING SCALE: 1/8" = 1'-0"
PTN: 61192-166 FILE NO: 1-H6

DESIGN DEVELOPMENT
MARCH 15, 2022

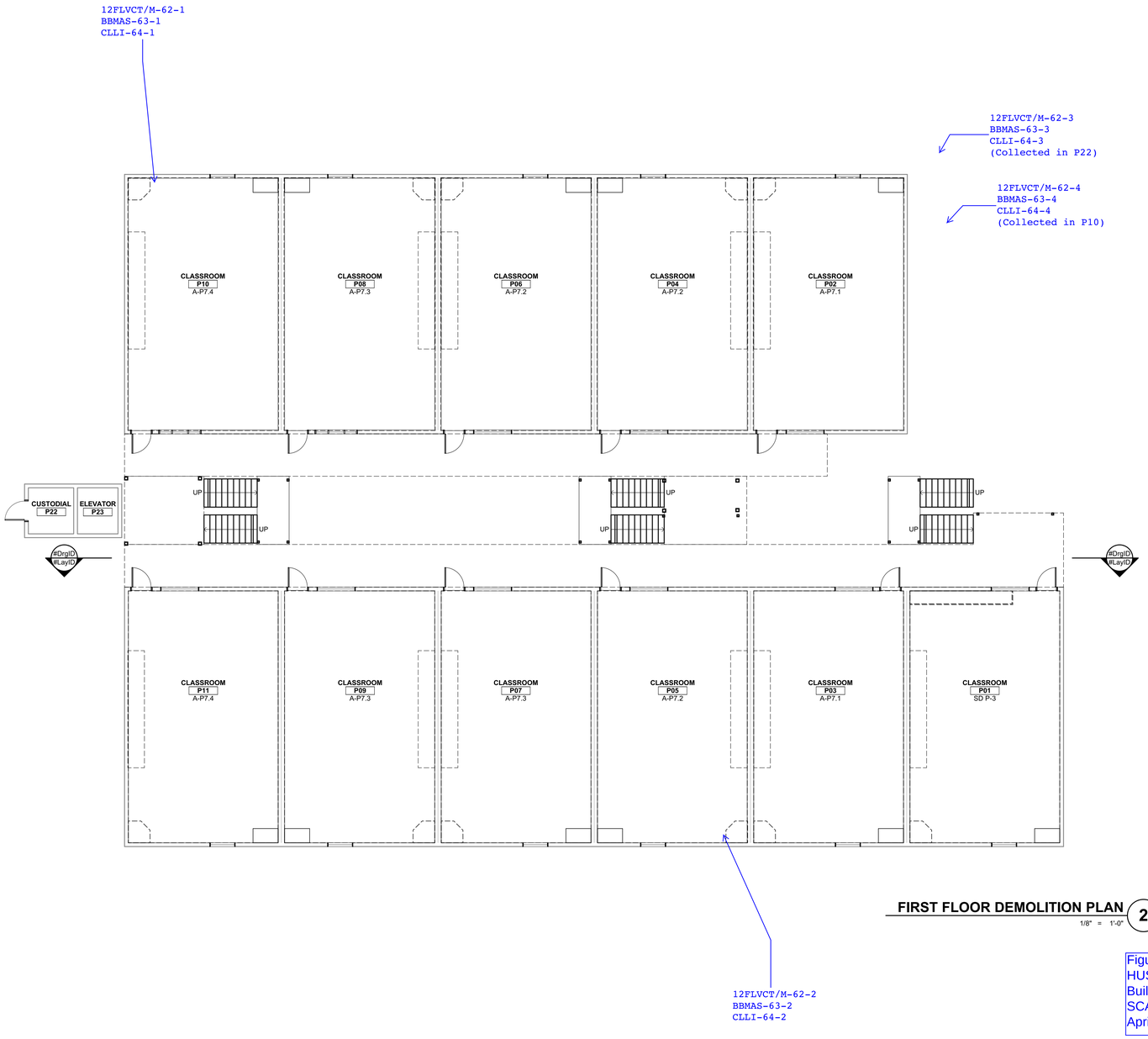
SHEET TITLE

BUILDING O DEMO & FLOOR PLANS

SHEET NUMBER

A-O2.1

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod Site S224;3/14/2022;1:23 PM



FIRST FLOOR DEMOLITION PLAN 2

1/8" = 1'-0"

Figure 8. Sample Location Diagram
HUSD, Tennyson HS
Building P
SCA Proj. #: B-13490.02
April 12-14, 2022

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

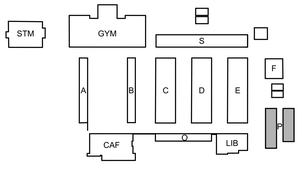
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILIENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE. DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: MARCH 15, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119941

ARCH PROJECT NO:	1910.00
DRAWN BY:	*fill out manualy ea sheet!*
DRAWING SCALE:	1/8" = 1'-0"
PTN: 61192-166	FILE NO: 1-H6

90% DESIGN DEV'T

MARCH 15, 2022

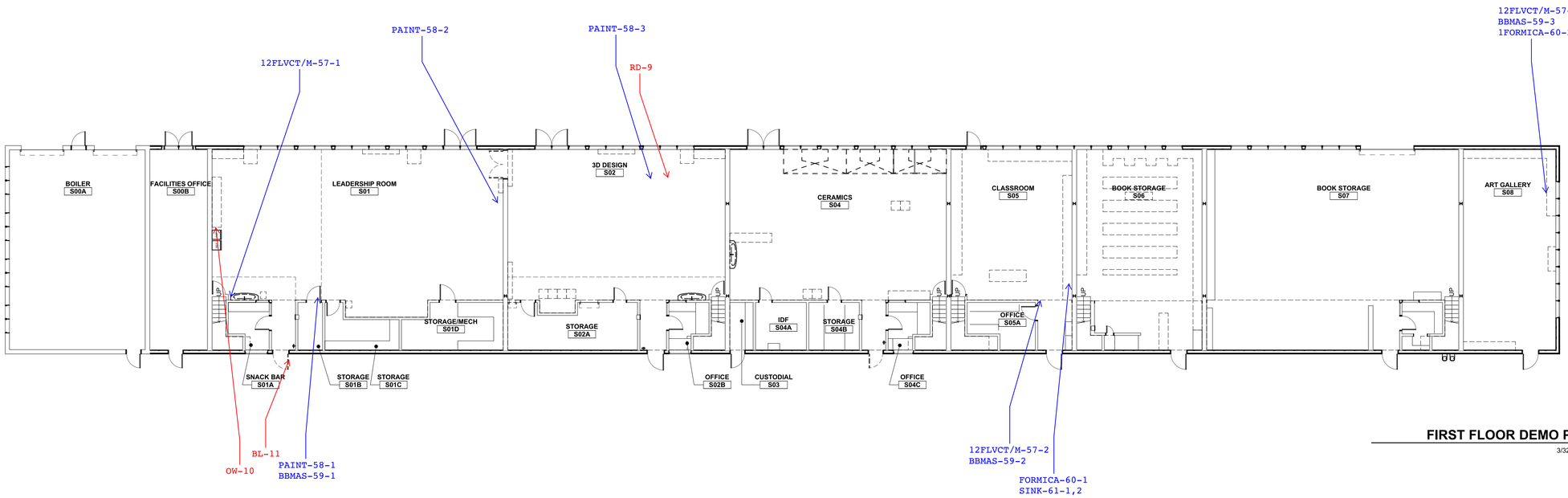
SHEET TITLE

BUILDING P FIRST FLOOR DEMO PLAN

SHEET NUMBER

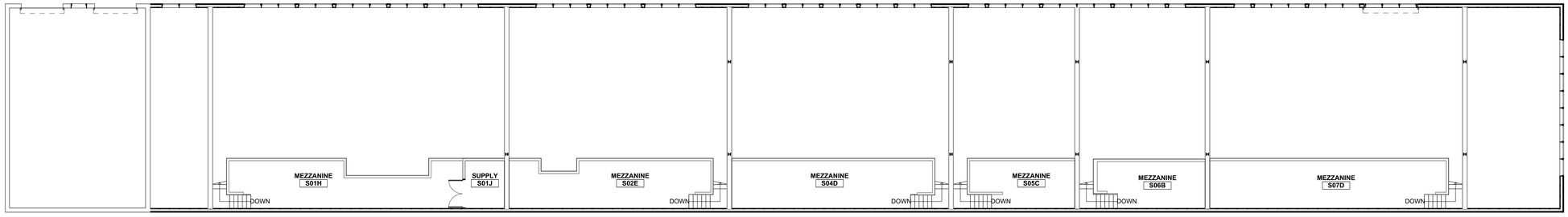
A-P2.0

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod P SD24.3/14/2022 1:10 PM



FIRST FLOOR DEMO PLAN 1

3/32" = 1'-0"



SECOND FLOOR DEMO PLAN 2

3/32" = 1'-0"

Figure 9. Sample Location Diagram
HUSD, Tennyson HS
Building S
SCA Proj. #: B-13490.02
April 12-14, 2022

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

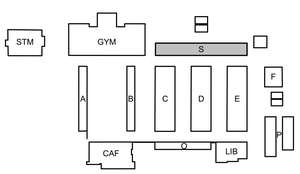
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE, DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.
24. REMOVE (E) TILE LEDGE

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: MARCH 15, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119941

ARCH PROJECT NO: 1910.00
DRAWN BY:
DRAWING SCALE:
PTN: 61192-166 FILE NO: 1-H6

90% DESIGN DEV'T

MARCH 15, 2022

SHEET TITLE

BUILDING S DEMOLITION PLANS

SHEET NUMBER

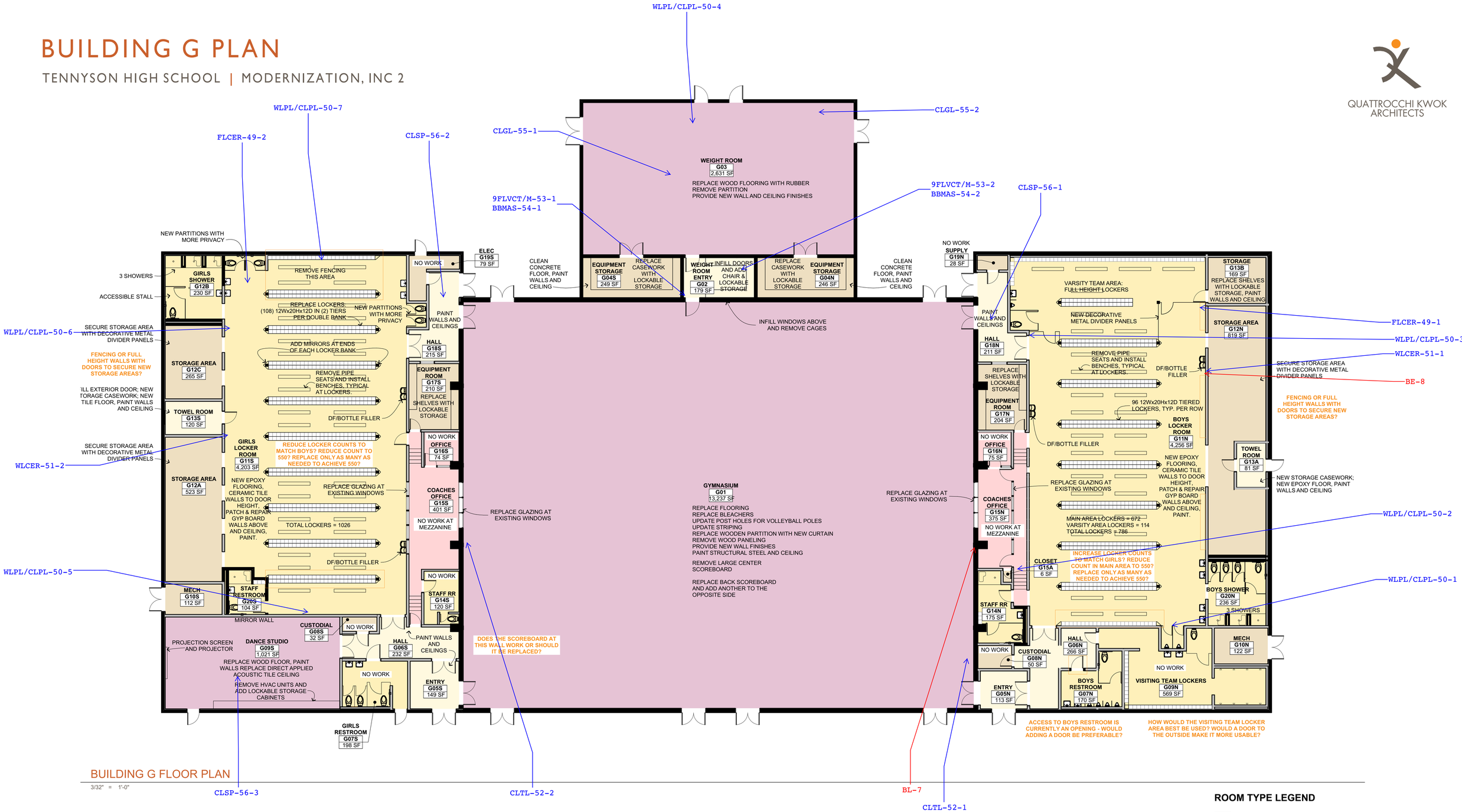
A-S2.0

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod S SD24.3/15/2022-10:25 AM

BUILDING G PLAN

TENNYSON HIGH SCHOOL | MODERNIZATION, INC 2

QUATTROCCHI KWOK ARCHITECTS



BUILDING G FLOOR PLAN

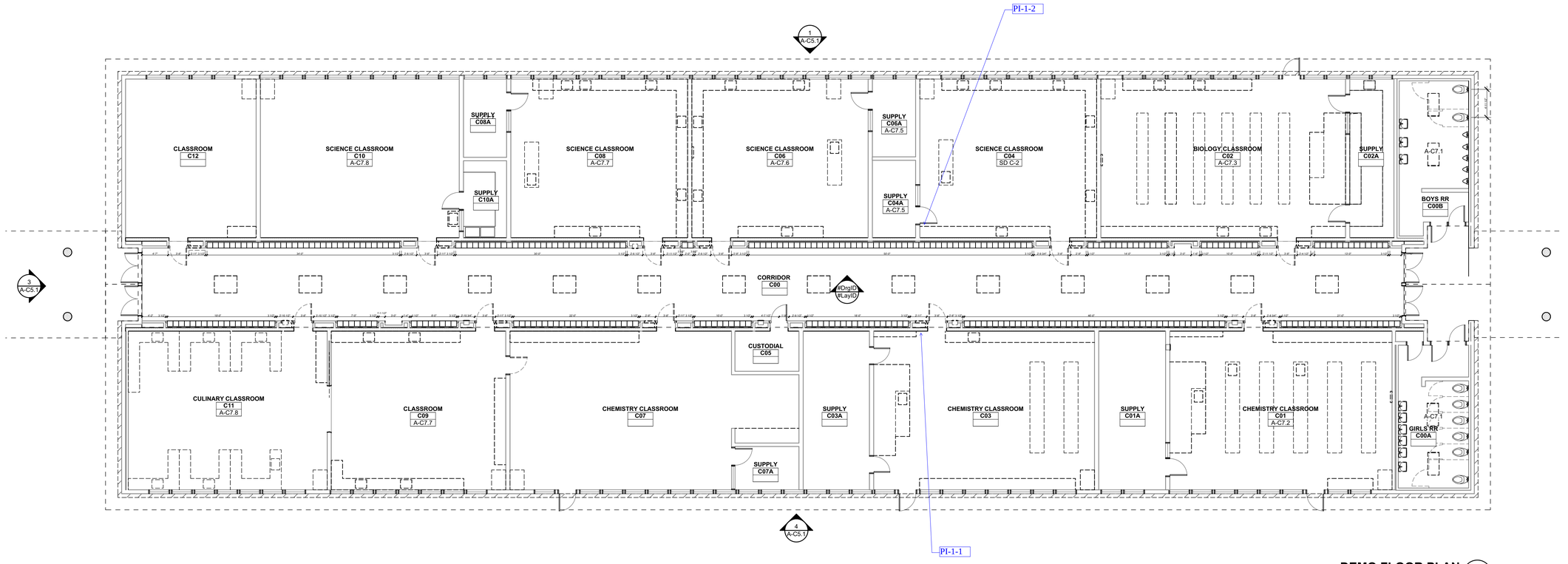
3/32" = 1'-0"

ROOM TYPE LEGEND

- CLASSROOM SUPPLY
- GYMNASIUM
- RESTROOM
- CIRCULATION
- CUSTODIAL/STORAGE

NORTH

Figure 10. Sample Location Diagram
HUSD, Tennyson HS
Building G
SCA Proj. #: B-13490.02
April 12-14, 2022



DEMO FLOOR PLAN 1

1/8" = 1'-0"

Figure 1. Sample Location Diagram
HUSD, Tennyson HS
Building C
SCA Proj. #: B-13490.02
June 30, 2022

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

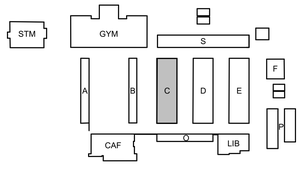
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
3. REMOVE (E) ITEMS FROM CEILING AND GLUED-ON ACOUSTICAL CEILING TILES. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE, DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D.
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) ITEMS, WIREMOLD, TRIM & ASSOCIATED HARDWARE FROM WALLS 8'-0" A.F.F. & BELOW. PREPARE WALLS FOR NEW WORK
11. PROTECT (E) DOOR & WINDOW TRIM. PREPARE AREAS FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITION, PREPARE AREA FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE FROM WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) FIRE EXTINGUISHER CABINET
21. PROTECT (E) ELECTRICAL PANEL(S).
22. PROTECT (E) FINISHES U.O.N.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION SEE MECHANICAL DRAWINGS.
24. REMOVE (E) TILE LEDGE

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
MARK QUATTROCCHI
LICENSE # C15438
EXP JULY 31, 2023
STATE OF CALIFORNIA

SIGNED: MARCH 15, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 2

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

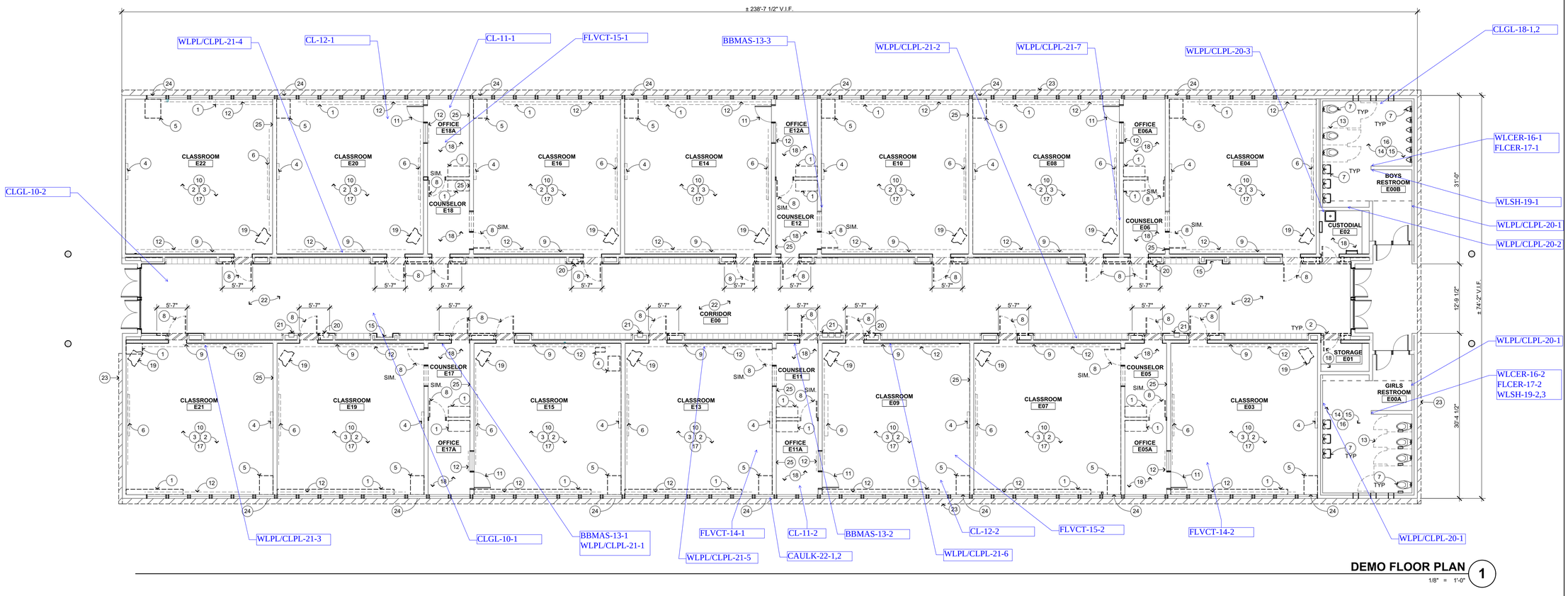
DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY:
DRAWING SCALE:
PTN: 61192-166 FILE NO: 1-H6
90% DESIGN DEV'T
MARCH 15, 2022
SHEET TITLE

BUILDING C DEMOLITION PLAN

SHEET NUMBER

A-C2.0

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod C SD24.3/14/2022 12:16 PM



DEMO FLOOR PLAN 1

1/8" = 1'-0"

Figure 2. Sample Location Diagram
HUSD, Tennyson HS
Building E
SCA Proj. #: B-13490.02
June 30, 2022

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

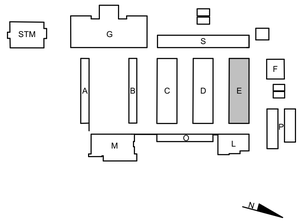
1. REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
2. REMOVE (E) RESILIENT FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK. CUT CLEAN, STRAIGHT LINES AT ALL FLOORING TRANSITION LOCATIONS. PRESERVE AND PROTECT FLOORING TO REMAIN.
3. REMOVE (E) GLUED-ON ACOUSTICAL CEILING TILES & MISC. ITEMS FROM CEILING. PREPARE CEILING FRAMING FOR NEW WORK.
4. REMOVE (E) ELECTRICAL ITEMS, S.E.D. PREPARE AREA FOR NEW WORK.
5. REMOVE (E) MECHANICAL ITEM AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK, S.M.D.
6. REMOVE (E) WALL MOUNTED PROJECTION SCREEN & ASSOCIATED HARDWARE. DELIVER TO OWNER. PREPARE AREA FOR NEW WORK
7. REMOVE (E) PLUMBING ITEM / FIXTURE, PREPARE AREA FOR NEW WORK, S.P.D. (2 / A-10.2)
8. REMOVE (E) DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE AND PORTION OF WALL. PREPARE AREA FOR NEW WORK
9. REMOVE (E) MARKER BOARDS & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK
10. REMOVE (E) PLASTER, TRIM, RACEWAYS, MISC ITEMS & ASSOCIATED HARDWARE TO STUDS. (E) DIAG. SHEATHING TO REMAIN WHERE OCCURS, PROTECT. PREPARE WALLS FOR NEW WORK.
11. PROTECT (E) DOOR & WINDOW FRAMES. PREPARE FRAMES FOR NEW WORK. SEE INTERIOR ELEVATIONS.
12. REMOVE (E) WINDOW CURTAINS & ASSOCIATED HARDWARE. PREPARE AREAS FOR NEW WORK
13. REMOVE (E) TOILET PARTITIONS, PREPARE AREAS FOR NEW WORK
14. REMOVE (E) TILE FLOORING SYSTEM. PREPARE SUBSTRATE FOR NEW WORK.
15. REMOVE (E) TILE AND GYP BOARD TO STUDS AT WALLS. PREPARE WALLS FOR NEW WORK.
16. REMOVE (E) TOILET ACCESSORIES FROM WALLS.
17. REMOVE (E) CLOCK & ANNOUNCEMENT SYSTEM. STORE AND PROTECT FOR REINSTALLATION. INFORM ARCHITECT OF ANY DAMAGED ITEMS BEFORE REMOVAL FROM WALLS.
18. (E) RESILENT TILE FLOORING TO REMAIN, PROTECT. CUT CLEAN, STRAIGHT LINES AT ALL FLOORING TRANSITION LOCATIONS.
19. REMOVE (E) TV, TV MOUNT, WIREMOLD & ASSOCIATED HARDWARE. PREPARE WALLS FOR NEW WORK.
20. REMOVE (E) F.E. CABINET PREPARE AREA FOR NEW WORK.
21. REMOVE (E) ELECTRICAL AND LOW VOLTAGE PANELS. PREPARE AREA FOR NEW WORK. S.E.D.
22. (E) CORRIDOR FINISHES TO REMAIN U.O.N., PROTECT. CUT CLEAN, STRAIGHT LINES AT ALL FLOORING TRANSITION LOCATIONS.
23. REMOVE (E) HYDRONIC PIPING AND METAL SHROUD, PREPARE AREA FOR NEW WORK. FOR MORE INFORMATION S.M.D.
24. REMOVE (E) UPPER LOUVER AND LOWER GLAZING AND PREPARE WINDOW & OPENING FOR NEW WORK
25. REMOVE (E) WALL FINISH AS REQUIRED TO PERFORM WORK ON THIS SIDE OF WALL & PROTECT (E) DIAG. SHEATHING ON OPPOSITE SIDE OF WALL. PREPARE WALLS FOR NEW WORK

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) WOOD FRAMING - 1 HR RATED
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE FLOOR PLAN & DOOR SCHEDULE
- APPROXIMATE AREAS OF HYDRONIC PIPING REMOVAL, COORD W/ MECHANICAL DWGS, V.I.F.
- EXTENT OF VCT REMOVAL IN CORRIDOR

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: APRIL 18, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 1

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

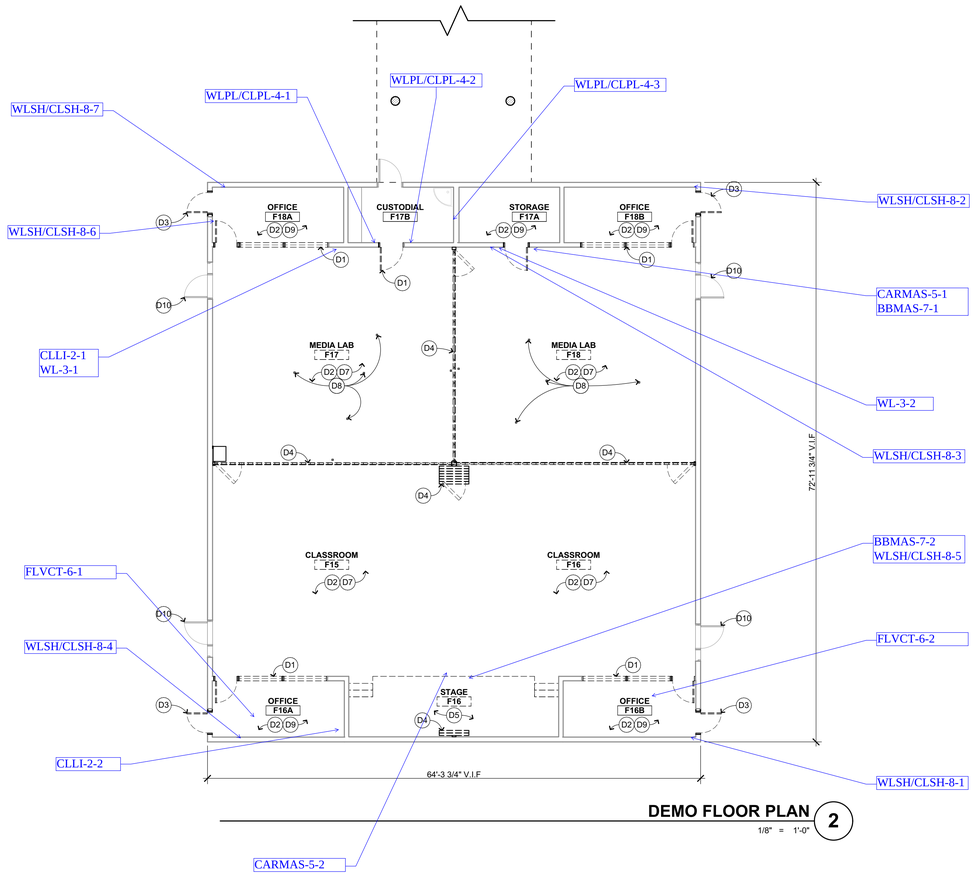
DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY: *BMP*
DRAWING SCALE: AS NOTED
PTN: 61192-166 FILE NO: 1-H6

CDs
APRIL 18, 2022

SHEET TITLE
BUILDING E DEMOLITION PLAN

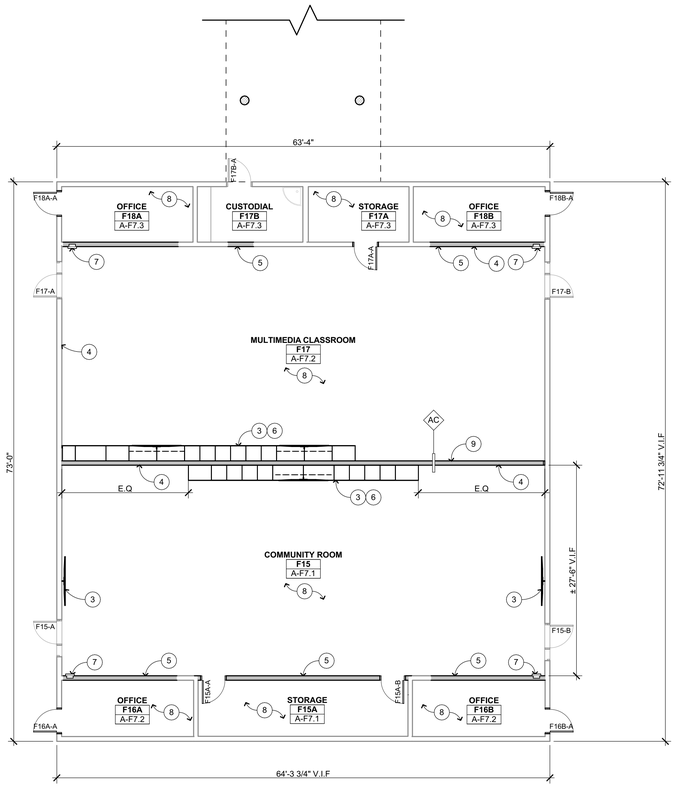
SHEET NUMBER
A-E2.0

BIM360ud: BIMCLOUD-QKA - BIM/cloud/1910.00 Tennyson HS Mod/1910.00 THS Mod E SD24 6/3/2022 4:33 PM



DEMO FLOOR PLAN 2

1/8" = 1'-0"



FLOOR PLAN 1

1/8" = 1'-0"

Figure 3. Sample Location Diagram
HUSD, Tennyson HS
Building F
SCA Proj. #: B-13490.02
June 30, 2022

NORTH

DEMOLITION PLAN GENERAL NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMOLITION PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

- D1 REMOVE (E) DOOR, WINDOW, FRAME, TRIM, THRESHOLD & ASSOCIATED HARDWARE AS WELL AS VINYL WALL COVERING. PREPARE WALL FOR NEW WORK
- D2 REMOVE (E) FLOORING, MASTIC AND BASE. PREPARE SUBSTRATE FOR NEW WORK.
- D3 REMOVE PORTION OF (E) WALL, CONC. CURB, DOOR, FRAME, THRESHOLD & ASSOCIATED HARDWARE. PREPARE AREA FOR NEW WORK
- D4 REMOVE (E) FOLDING PARTITION & ASSOCIATED HARDWARE. PREPARE WALLS, FLOORS AND CEILING FOR NEW WORK
- D5 REMOVE (E) STAGE & ASSOCIATED HARDWARE. PREPARE WALLS AND FLOOR FOR NEW WORK
- D6 REMOVE (E) CASEWORK AND ASSOCIATED HARDWARE, PREPARE AREA FOR NEW WORK.
- D7 REMOVE (E) 2x4 CEILING TILES AND GRID. PREPARE WALLS FOR NEW WORK.
- D8 REMOVE (E) ELECTRICAL SERVICE POLES. PREPARE FOR NEW ELECTRICAL WORK.
- D9 REMOVE (E) 2x4 CEILING TILES. (E) GRID TO REMAIN, PREPARE FOR NEW WORK.
- D10 REMOVE (E) DOOR HARDWARE. (E) DOOR TO REMAIN, PREPARE FOR NEW HARDWARE, SEE DOOR SCHEDULE SHEET A-8.1.

DEMOLITION LEGEND

EXISTING & DEMOLITION WORK:

- (E) ITEM TO BE DEMOLISHED
- (E) WOOD FRAMED WALL AND ASSOCIATED WORK TO BE DEMOLISHED, PATCH & REPAIR FLOOR AS REQ
- (E) ITEM TO REMAIN
- (E) WALL TO REMAIN, PROTECT AND PRESERVE
- (E) DOOR/FRAME TO BE DEMOLISHED, SEE DEMO KEYNOTES, FLOOR PLAN & DOOR SCHEDULE
- (E) DOOR/FRAME TO REMAIN, SEE DEMO KEYNOTES, FLOOR PLAN & DOOR SCHEDULE

FLOOR PLAN GENERAL NOTES

1. FOR SITE CONDITIONS SEE SITE PLAN SHEET A1.1
2. REFER TO SITE PLANS FOR SITE FEATURES NOT OTHERWISE INDICATED.
3. REFER TO SHEETS A-8.3 AND A-8.4 FOR SIGNAGE NOT SHOWN.
4. REFER TO REFLECTED CEILING PLAN FOR CLERESTORY WINDOWS.
5. ALL INTERIOR WALL FRAMING AND GYP.BD. EXTEND TO UNDERSIDE OF ROOF SHEATHING ABOVE, U.O.N.
6. REFER TO SHEETS A-8.1, A-8.3 AND A-8.4 FOR ADDITIONAL DOOR INFORMATION.

FLOOR PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

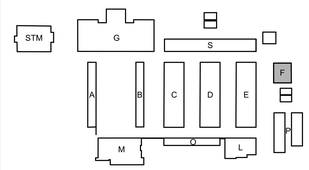
1. MECHANICAL ITEM, S.M.D.
2. PLUMBING ITEM / FIXTURE, TYP., S.P.D.
3. ELECTRICAL ITEM, S.E.D.
4. INSTALL MARKERBOARD METAL PANELS, SEE 22 / A-10.1 & INTERIOR ELEVATIONS
5. INFILL (E) WALL TO MATCH IN THICKNESS, TEXTURE & FINISH, PAINT. SEE INTERIOR ELEVATIONS & 9 / A-9.1
6. INSTALL CASEWORK WITH BLOCKING, SEE 3 / A-10.3
7. INSTALL SEMI-RECESSED FIRE EXTINGUISHER CABINET, SEE 15 / A-10.1 (FE CLASS ABC, UL 3-A,40-B:C)
8. PATCH & REPAIR (E) WALL TO MATCH (E) IN THICKNESS, TEXTURE, AND FINISH AT REMOVED WALL-MOUNTED ITEMS, TYP. PAINT.
9. ALIGN CENTERLINE OF WALL WITH CENTERLINE OF STRUCTURAL BEAM ABOVE.
10. PATCH & REPAIR (E) WALL TO MATCH (E) IN THICKNESS, TEXTURE, TYP. PAINT. SEE DETAIL 4 / A-9.1

WALL TYPE LEGEND

S.S.D. FOR WOOD FRAMING SIZES

- (E) WOOD FRAMING - NON RATED
- WOOD FRAMING - NON RATED, S.S.D.
- AC ACOUSTIC WALL. SEE 23 / A-10.2, 27 / A-10.2, 28 / A-10.2, 34 / A-10.2 SIM.

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: APRIL 18, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 1

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119941

ARCH PROJECT NO:	1910.00
DRAWN BY:	*BMP*
DRAWING SCALE:	1/8" = 1'-0"
PTN: 61192-166	FILE NO: 1-H6

CDs

APRIL 18, 2022

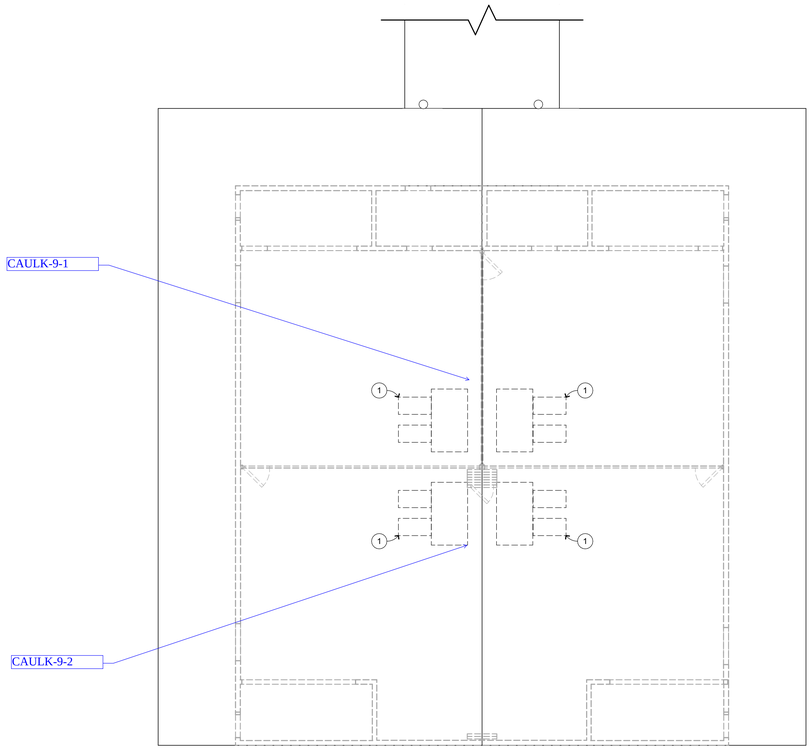
SHEET TITLE

BUILDING F DEMO AND FLOOR PLANS

SHEET NUMBER

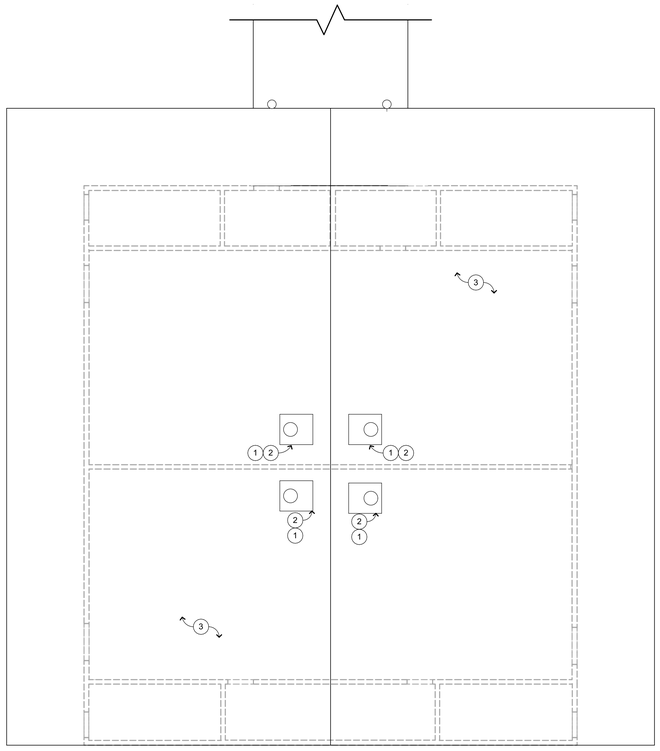
A-F2.1

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod F SD24.6/3/2022 4:41 PM



DEMO ROOF PLAN 1

1/8" = 1'-0"



ROOF PLAN 2

1/8" = 1'-0"

Figure 4. Sample Location Diagram
HUSD, Tennyson HS
Building F, Roof
SCA Proj. #: B-13490.02
June 30, 2022

NORTH

DEMO ROOF PLAN NOTES

1. NEATLY CUT AND REMOVE SURFACES AND FINISHES AS REQUIRED OR TO A NATURAL POINT OF DIVISION TO ENABLE INSTALLATION OF BLOCKING, BACKING, FRAMING, SHEATHING, UTILITIES OR OTHER CONCEALED WORK, WHETHER SPECIFICALLY SHOWN OR INFERRED FOR SUPPORT OR RENOVATION. REFER TO ELECTRICAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR CONCEALED WORK NOT SHOWN ON ARCHITECTURAL DRAWINGS.
2. REPAIR AND REPLACE ALL EXISTING SURFACES AND FINISHES TO EXISTING UNDISTURBED WORK.
3. NOTES AND SYMBOLS ARE TO APPLY AT ALL AREAS OF SIMILAR GRAPHIC REPRESENTATION. SUCH INDCATIONS MAY BE LIMITED TO PROMOTE CLARITY OR AVOID REDUNDANCY. NO LIMITATIONS OF APPLICATION SHALL BE CONSTRUED WITHOUT SPECIFIC NOTATION.

DEMO ROOF PLAN LEGEND

(E) TPO ROOFING O/ FRAMING

WALLS BELOW

DEMO ROOF PLAN KEYNOTES

NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

(1) MECHANICAL UNIT AND EXPOSED ROOFTOP DUCTWORK TO BE REMOVED, S.M.D., S.S.D. PREPARE AREA FOR NEW WORK.

ROOF PLAN NOTES

1. ALL ROOFING TO BE CLASS A.
2. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR ROOF PENETRATION LOCATIONS NOT OTHERWISE INDICATED, TYPICAL.
3. MECHANICAL UNIT MOUNTING CURBS PER (12 / S-0.1) (E / M-4.1) (3 / A-9.2)
4. PATCH ROOF AS REQUIRED FOR PENETRATIONS, SEE (2 / A-9.2) (4 / A-9.2) (6 / A-9.2) (8 / A-9.2)

ROOF PLAN LEGEND

(E) TPO ROOFING O/ FRAMING

WALLS BELOW

ROOF PLAN KEYNOTES

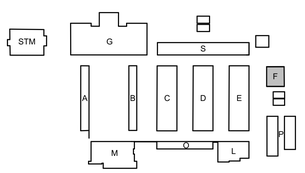
NOT ALL KEYNOTES MAY APPLY TO THIS SHEET

(1) MECHANICAL ITEM (S.M.D.), FOR CURB WHERE OCCURS SEE (12 / S-0.1)

(2) PATCH & REPAIR ROOFING AS REQUIRED TO INSTALL MECHANICAL & ELECTRICAL ITEMS, S.M.D. & S.E.D. SEE (E / M-4.1) (3 / A-9.2)

(3) (E) ROOFING TO REMAIN , PROTECT

KEY PLAN



QUATTROCCHI KWOK ARCHITECTS
Main:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525,
Oakland, CA 94607
(707) 576-0829

LICENSED ARCHITECT
JIM THEISS
LICENSE # C22643
EXP JUNE 30, 2023
STATE OF CALIFORNIA

SIGNED: APRIL 18, 2022

TENNYSON HIGH SCHOOL

MODERNIZATION, INC 1

27035 WHITMAN ST
HAYWARD, CA 94544

HAYWARD UNIFIED SCHOOL DISTRICT

DSA APP NO. 01-119941
ARCH PROJECT NO: 1910.00
DRAWN BY:
DRAWING SCALE:
PTN: 61192-166 FILE NO: 1-H6
CDs
APRIL 18, 2022
SHEET TITLE

BUILDING F DEMO ROOF & ROOF PLANS

SHEET NUMBER

A-F4.1

BIMcloud: BIMCLOUD-QKA - BIMcloud/1910.00 Tennyson HS Mod/1910.00 THS Mod F SD24 6/3/2022 4:42 PM

Attachment 1

Asbestos Laboratory Reports

eurofins | Built Environment Reservoirs

April 21, 2022

Subcontractor Number:
Laboratory Report: **RES 522783-1**
Project #/P.O. #: **B-13490.02**
Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**

Dan Leung
SCA Environmental, Inc.
320 Justin Drive
San Francisco CA 94112

Dear Dan,

Eurofins Reservoirs is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA LAP, LLC), Lab ID 101533 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Eurofins Reservoirs has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 522783-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Eurofins Reservoirs will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed, as received by the customer. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Eurofins Reservoirs Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Jeanne Spencer
by Tyler Hutchinson

Jeanne Spencer
President

DATA QA
04/21/2022

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - 12FLVCT/M-1-1	A	Tan mastic	1		ND	0	100
	B	Blue tile	99		ND	0	100
522783 - 12FLVCT/M-1-2	A	White compound	4		ND	0	100
	B	Tan mastic	4		ND	0	100
	C	Blue tile	92		ND	0	100
522783 - 12FLVCT/M-1-3	A	Tan/black mastic w/ gray granular debris	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - WLSH/CLSH-2-1	A	White compound w/ gray/multi-colored paint	15		ND	0	100
	B	White/tan drywall	85		ND	30	70
522783 - WLSH/CLSH-2-2	A	White compound w/ gray/multi-colored paint	15		ND	0	100
	B	White/tan drywall	85		ND	20	80
522783 - WLSH/CLSH-2-3	A	White compound w/ gray/multi-colored paint	10		ND	0	100
	B	White/tan drywall	90		ND	10	90
522783 - BBMAS-3-1	A	Yellow/tan mastic	100		ND	0	100
522783 - BBMAS-3-2	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-3-3	A	Yellow/tan mastic	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - FORMICA-4-1	A	White/brown fibrous resinous material w/ colorless adhesive	100		ND	60	40
522783 - FORMICA-4-2	A	White/brown fibrous resinous material	100		ND	60	40
522783 - SINK-5-1	A	Gray sink undercoating	100		ND	8	92
522783 - SINK-5-2	A	Gray sink undercoating	100		ND	8	92
522783 - SINK-6-1	A	Black sink undercoating	100	Chrysotile	8	0	92
522783 - SINK-6-2	A	Black mastic	100		ND	0	100
522783 - FIREDOOR-7-1	A	White fibrous micaceous material	100		ND	35	65
522783 - FIREDOOR-7-2	A	White fibrous micaceous material	100		ND	30	70
522783 - WLPL/CLPL-8-1	A	Off white/white granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-8-2	A	Off white/white granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-8-3	A	White texture w/ gray paint	5		ND	0	100
	B	White granular plaster	20		ND	0	100
	C	White compound	35		ND	0	100
	D	White plaster w/ gray/multi-colored paint	40		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - 12FLVCT/M-9-1	A	Tan adhesive	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - 12FLVCT/M-9-2	A	Tan mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - 12FLVCT/M-10-1	A	Tan mastic	2		ND	0	100
	B	Yellow mastic	5		ND	0	100
	C	Blue tile	25		ND	0	100
	D	Off white tile	68		ND	0	100
522783 - 12FLVCT/M-10-2	A	Tan mastic	2		ND	0	100
	B	Yellow/green mastic	5		ND	0	100
	C	Off white tile	45		ND	0	100
	D	Blue tile	48		ND	0	100
522783 - CARMAS-11-1	A	Blue mastic	100		ND	0	100
522783 - CARMAS-11-2	A	Tan mastic	100		ND	0	100
522783 - WLPL/CLPL-12-1	A	Off white/white granular plaster w/ gray/multi-colored paint	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - WLPL/CLPL-12-2	A	Off white/white granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-12-3	A	Off white/white granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - BBMAS-13-1	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-13-2	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-13-3	A	Yellow mastic	100		ND	0	100
522783 - CONC-14-1	A	Gray granular cementitious material	100		ND	0	100
522783 - CONC-14-2	A	Gray granular cementitious material	100		ND	0	100
522783 - CONC-14-3	A	Gray granular cementitious material	100		ND	0	100
522783 - 12FLVCT/M-15-1	A	Tan/black mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - 12FLVCT/M-15-2	A	Tan mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - 12FLVCT/M-15-3	A	Tan mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - WLPL/CLPL-16-1	A	White granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-16-2	A	White granular plaster w/ gray/multi-colored paint	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - WLPL/CLPL-16-3	A	White granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-16-4	A	White granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-16-5	A	White granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - BBMAS-17-1	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-17-2	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-17-3	A	Yellow mastic	100		ND	0	100
522783 - FORMICA-18-1	A	Black/brown counter top w/ colorless adhesive	100		ND	60	40
522783 - FORMICA-18-2	A	Beige/multi-colored counter top w/ white/yellow adhesive	100		ND	50	50
522783 - FORMICA-18-3	A	Gray/multi-colored counter top w/ tan adhesive	100		ND	60	40
522783 - SINK-19-1	A	Gray sink undercoating	100		ND	10	90
522783 - SINK-19-2	A	Gray sink undercoating	100		ND	10	90
522783 - CLGL-20-1	A	Tan adhesive	20		ND	0	100
	B	Gray/white ceiling tile	80		ND	65	35
522783 - CLGL-20-2	A	Tan adhesive	25		ND	0	100
	B	Gray/white ceiling tile	75		ND	70	30

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - WLCER-21-1	A	White grout	1		ND	0	100
	B	Off white granular cementitious material	15		ND	0	100
	C	Yellow/white ceramic tile	84		ND	0	100
522783 - WLCER-21-2	A	White grout	3		ND	0	100
	B	Off white granular cementitious material	10		ND	0	100
	C	Yellow/white ceramic tile	87		ND	0	100
522783 - 9FLVCT/M-22-1	A	Black mastic	5		ND	0	100
	B	Green tile	95	Chrysotile	10	0	90
522783 - 9FLVCT/M-22-2	A	Black mastic	6		ND	0	100
	B	Green/off white tile	94	Chrysotile	8	0	92
522783 - SINK-23-1	A	Black sink undercoating	100		ND	0	100
522783 - SINK-23-2	A	Black sink undercoating	100		ND	0	100
522783 - SINK-24-1	A	Brown/multi-colored ceramic material	100		ND	0	100
522783 - SINK-24-2	A	Brown/black ceramic material	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - 12FLVCT/M-25-1	A	Yellow adhesive w/ black mastic	5		ND	0	100
	B	Blue/white tile	95		ND	0	100
522783 - 12FLVCT/M-25-2	A	Gray granular cementitious material	4		ND	0	100
	B	Yellow/red adhesive	6		ND	0	100
	C	Blue/white tile	90		ND	0	100
522783 - 12FLVCT/M-25-3	A	Yellow/gray adhesive	4		ND	0	100
	B	Blue/white tile	96		ND	0	100
522783 - CARMAS-26-1	A	Colorless adhesive w/ white paint	50		ND	0	100
	B	Black foam	50		ND	0	100
522783 - CARMAS-26-2	A	Colorless adhesive	20		ND	0	100
	B	Black foam	40		ND	0	100
	C	Gray cementitious material	40		ND	0	100
522783 - WLPL/CLPL-27-1	A	Beige granular plaster w/ white/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-27-2	A	Beige granular plaster w/ white/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-27-3	A	Beige granular plaster w/ gray/multi-colored paint	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - WLPL/CLPL-27-4	A	Beige granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-27-5	A	Beige granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - BBMAS-28-1	A	Yellow/tan mastic	100		ND	0	100
522783 - BBMAS-28-2	A	Yellow/tan mastic	100		ND	0	100
522783 - BBMAS-28-3	A	Yellow/tan mastic	100		ND	0	100
522783 - CLGL-29-1	A	Tan adhesive	10		ND	0	100
	B	Brown adhesive	10		ND	0	100
	C	Gray ceiling tile	80		ND	70	30
522783 - CLGL-29-2	A	Tan adhesive	20		ND	0	100
	B	Gray/white ceiling tile	80		ND	65	35
522783 - WLCER-30-1	A	White grout	TR		ND	0	100
	B	Off white granular cementitious material	20		ND	0	100
	C	Yellow/white ceramic tile	80		ND	0	100
522783 - WLCER-30-2	A	White grout	20		ND	0	100
	B	Off white granular cementitious material	20		ND	0	100
	C	Yellow/white ceramic tile	60		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - FORMICA-31-1	A	Off white/brown counter top w/ tan adhesive	100		ND	60	40
522783 - FORMICA-31-2	A	Off white/brown counter top w/ tan adhesive	100		ND	60	40
522783 - SINK-32-1	A	Gray sink undercoating	100		ND	10	90
522783 - SINK-32-2	A	Gray sink undercoating	100		ND	8	92
522783 - WLPL/CLPL-33-1	A	Off white/white granular plaster w/ black/yellow paint	100		ND	0	100
522783 - WLPL/CLPL-33-2	A	Off white/white granular plaster w/ gray/yellow paint	100		ND	0	100
522783 - WLPL/CLPL-33-3	A	Off white/white granular plaster w/ gray/yellow paint	100		ND	0	100
522783 - WLPL/CLPL-34-1	A	Off white granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-34-2	A	Off white granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-34-3	A	Off white granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - CLGL-35-1	A	Brown adhesive	10		ND	0	100
	B	White/brown ceiling tile	90		ND	85	15
522783 - CLGL-35-2	A	Brown adhesive	35		ND	0	100
	B	Brown fibrous material	65		ND	90	10
522783 - CLGL-35-3	A	Brown fibrous material	20		ND	87	13
	B	Black/brown tar paper	80		ND	80	20

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - 12FLVCT/M-36-1	A	Tan/black mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - 12FLVCT/M-36-2	A	Tan mastic	1		ND	0	100
	B	Blue tile	99		ND	0	100
522783 - 12FLVCT/M-36-3	A	Tan/black mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - WLPL/CLPL-37-1	A	White granular plaster	100		ND	TR	100
522783 - WLPL/CLPL-37-2	A	White granular plaster	100		ND	TR	100
522783 - WLPL/CLPL-37-3	A	White granular plaster	100		ND	TR	100
522783 - BBMAS-38-1	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-38-2	A	Tan/black mastic	15		ND	0	100
	B	Yellow mastic	85		ND	0	100
522783 - BBMAS-38-3	A	Tan mastic	100		ND	0	100
522783 - CLGL-39-1	A	Brown adhesive	3		ND	0	100
	B	White/brown ceiling tile	97		ND	85	15

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - CLGL-39-2	A	Brown adhesive	25		ND	0	100
	B	White/brown ceiling tile	75		ND	80	20
522783 - CLGL-39-3	A	Brown adhesive	20		ND	0	100
	B	White/brown ceiling tile	80		ND	75	25
522783 - CONC-40-1	A	Gray granular cementitious material	100		ND	0	100
522783 - CONC-40-2	A	Gray granular cementitious material w/ tan/yellow adhesive	100		ND	0	100
522783 - 12FLVCT/M-41-1	A	Tan mastic	TR		ND	0	100
	B	Blue tile	100		ND	0	100
522783 - 12FLVCT/M-41-2	A	Tan/black mastic w/ off white compound	7		ND	0	100
	B	Blue tile	93		ND	0	100
522783 - 12FLVCT/M-41-3		Sample Not Received.					
522783 - CARMAS-42-1	A	Tan adhesive	25	Chrysotile	3	0	97
	B	Blue/off white carpet	75		ND	85	15

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - CARMAS-42-2	A	Off white carpet	25		ND	50	50
	B	Black adhesive	30		ND	0	100
	C	Tan adhesive	45	Chrysotile	6	0	94
522783 - BBMAS-43-1	A	Beige adhesive	100		ND	0	100
522783 - BBMAS-43-2	A	Beige adhesive	100		ND	0	100
522783 - CLLI-44-1	A	Gray/white ceiling tile	100		ND	60	40
522783 - CLLI-44-2	A	Gray/white ceiling tile	100		ND	50	50
522783 - CLLI-45-1	A	Gray/white ceiling tile	100		ND	50	50
522783 - CLLI-45-2	A	Yellow/white ceiling tile	100		ND	55	45
522783 - CARMAS-46-1	A	Tan adhesive	15		ND	0	100
	B	Gray/multi-colored carpet	85		ND	85	15
522783 - CARMAS-46-2	A	Black resinous material	5		ND	0	100
	B	White leveling compound	95		ND	0	100
522783 - 12FLVCT/M-47-1	A	Yellow adhesive	8		ND	0	100
	B	Blue/multi-colored tile	92		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - 12FLVCT/M-47-2	A	Yellow adhesive	2		ND	0	100
	B	Blue/multi-colored tile	98		ND	0	100
522783 - BBMAS-48-1	A	Beige adhesive w/ white resinous material	100		ND	0	100
522783 - BBMAS-48-2	A	Beige adhesive	100		ND	0	100
522783 - FLCER-49-1	A	Off white compound	2		ND	0	100
	B	Gray granular cementitious material	15		ND	0	100
	C	Green ceramic tile	40		ND	0	100
	D	Tan granular cementitious material	43		ND	0	100
522783 - FLCER-49-2	A	Tan granular cementitious material	5		ND	0	100
	B	Gray granular cementitious material	10		ND	0	100
	C	Blue/multi-colored ceramic tile	85		ND	0	100
522783 - WLPL/CLPL-50-1	A	Gray granular cementitious material	40		ND	0	100
	B	Gray granular plaster w/ off white/multi-colored paint	60		ND	0	100
522783 - WLPL/CLPL-50-2	A	Gray granular plaster	100		ND	0	100
522783 - WLPL/CLPL-50-3	A	Gray granular cementitious material	5		ND	0	100
	B	Gray granular plaster	95		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - WLPL/CLPL-50-4	A	White granular plaster	100		ND	0	100
522783 - WLPL/CLPL-50-5	A	Gray granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLPL/CLPL-50-6	A	Gray granular plaster	100		ND	0	100
522783 - WLPL/CLPL-50-7	A	Gray granular plaster w/ gray/multi-colored paint	100		ND	0	100
522783 - WLCER-51-1	A	Gray mortar	20		ND	0	100
	B	White grout	20		ND	0	100
	C	Off white/white ceramic tile	60		ND	0	100
522783 - WLCER-51-2	A	Gray mortar	15		ND	0	100
	B	White grout	15		ND	0	100
	C	Off white/white ceramic tile	70		ND	0	100
522783 - CLTL-52-1	A	White/brown ceiling tile	100		ND	80	20
522783 - CLTL-52-2	A	White/brown ceiling tile	100		ND	85	15
522783 - 9FLVCT/M-53-1	A	Black mastic	8		ND	0	100
	B	Brown tile	92	Chrysotile	8	0	92
522783 - 9FLVCT/M-53-2	A	Tan/black mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - BBMAS-54-1	A	Light brown mastic	100		ND	0	100
522783 - BBMAS-54-2	A	Light brown mastic	100		ND	0	100
522783 - CLGL-55-1	A	Brown adhesive	100		ND	0	100
522783 - CLGL-55-2	A	Brown adhesive	100		ND	0	100
522783 - CLSP-56-1	A	White/gray ceiling tile	100		ND	60	40
522783 - CLSP-56-2	A	White/gray ceiling tile	100		ND	70	30
522783 - 12FLVCT/M-57-1	A	Tan mastic	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - 12FLVCT/M-57-2	A	Tan mastic	2		ND	0	100
	B	Blue tile	98		ND	0	100
522783 - 12FLVCT/M-57-3	A	Tan/black mastic	1		ND	0	100
	B	Blue tile	99		ND	0	100
522783 - PAINT-58-1	A	Red/gray paint	100		ND	0	100
522783 - PAINT-58-2	A	Red/gray paint	100		ND	0	100
522783 - PAINT-58-3	A	Red paint	100		ND	0	100
522783 - BBMAS-59-1	A	Tan mastic	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - BBMAS-59-2	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-59-3	A	Yellow mastic	100		ND	0	100
522783 - FORMCA-60-1	A	Black counter top w/ tan adhesive	100		ND	50	50
522783 - FORMCA-60-2	A	Tan/brown counter top	100		ND	65	35
522783 - SINK-61-1	A	Black sink undercoating	100		ND	0	100
522783 - SINK-61-2	A	Black sink undercoating	100		ND	0	100
522783 - 12FLVCT/M-62-1	A	Tan mastic w/ white compound	3		ND	0	100
	B	Blue tile	97		ND	0	100
522783 - 12FLVCT/M-62-2	A	Tan mastic	TR		ND	0	100
	B	Gray leveling compound	10		ND	0	100
	C	Blue tile	90		ND	0	100
522783 - 12FLVCT/M-62-3	A	Gray leveling compound	1		ND	0	100
	B	Tan mastic	1		ND	0	100
	C	Blue tile	98		ND	0	100
522783 - 12FLVCT/M-62-4	A	Tan/black mastic	5		ND	0	100
	B	Blue tile	95		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 522783-1**
Client: **SCA Environmental, Inc.**
Client Project/P.O.: **B-13490.02**
Client Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received: **April 18, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard 3**
Date Samples Analyzed: **April 20 - April 21, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
522783 - BBMAS-63-1	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-63-2	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-63-3	A	Yellow mastic	100		ND	0	100
522783 - BBMAS-63-4	A	Yellow mastic	100		ND	0	100
522783 - CLLI-64-1	A	White/gray ceiling tile	100		ND	50	50
522783 - CLLI-64-2	A	White/gray ceiling tile	100		ND	55	45
522783 - CLLI-64-3	A	White/gray ceiling tile	100		ND	65	35
522783 - CLLI-64-4	A	White/gray ceiling tile	100		ND	60	40
522783 - BBMAS-43-3 (Not on Original COC)	A	Tan mastic	100		ND	0	100
522783 - CARMAS-42-3 (Not on Original COC)	A	Black mastic	TR	Chrysotile	TR	0	100
	B	Tan mastic	100		ND	0	100
522783 - WLCER-51 (Not on Original COC)	A	Gray mortar	7		ND	0	100
	B	Off white/white ceramic tile	93		ND	0	100
522783 - CLSP-56-3 (Not on Original COC)	A	Gray/white ceiling tile	100		ND	60	40

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Andrew Roberts
Analyst

Tyler Hutchinson
Analyst

eurofins | Built Environment Reservoirs

RES Job #: 522783

SUBMITTED BY		INVOICE TO		CONTACT INFORMATION		SERIES
Company:	SCA Environmental, Inc.	Company:	SCA Environmental, Inc.	Contact:	Dan Leung	-1 PLM Standard 3
Address:	320 Justin Drive	Address:	320 Justin Drive	Phone:	(415) 882-1675	-2 Chem Standard
				Fax:		
	San Francisco, CA 94112		San Francisco, CA 94112	Cell:	(415) 867-9544	
Project Number and/or P.O. #:	B-13490.02			Final Data Deliverable Email Address:		
Project Description/Location:	HUSD Tennyson HS Pre-Renovation Hazmat Survey			dleung@sca-enviro.com (+ 1 ADDNL. CONTACTS)		

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm & Sat. 8am - 5pm

PLM / PCM / TEM — DTL RUSH PRIORITY STANDARD

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Dust — RUSH PRIORITY STANDARD

Metals — RUSH PRIORITY STANDARD

*PRIOR NOTICE REQUIRED FOR SAME DAY TAT

Organics* — SAME DAY RUSH PRIORITY STANDARD

MICROBIOLOGY LABORATORY HOURS: Weekdays: 8am - 5pm

Viable Analysis** — PRIORITY STANDARD

**TAT DEPENDENT ON SPEED OF MICROBIAL GROWTH

Medical Device Analysis — RUSH STANDARD

Mold Analysis — RUSH PRIORITY STANDARD

****Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.****

Special Instructions:

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

Client Sample ID Number (Sample ID's must be unique)	PLM - PLM Short Report (EPA/600/R-93/116)	TEM - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-. CARB Modified Ahera	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)	ORGANICS - Methamphetamine, TSS	VIABLES - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/-, Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	MEDICAL - Bioburden, LAL	MOLD - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
	ASBESTOS			CHEMISTRY			MICROBIOLOGY								
1 12FLVCT/M-1-1	X											B		04/13/22	
2 12FLVCT/M-1-2	X											B		04/13/22	
3 12FLVCT/M-1-3	X											B		04/13/22	
4 WLSH/CLSH-2-1	X											B		04/13/22	
5 WLSH/CLSH-2-2	X											B		04/13/22	
6 WLSH/CLSH-2-3	X											B		04/13/22	
7 BBMAS-3-1	X											B		04/13/22	
8 BBMAS-3-2	X											B		04/13/22	
9 BBMAS-3-3	X											B		04/13/22	
10 FORMICA-4-1	X											B		04/13/22	
11 FORMICA-4-2	X											B		04/13/22	
12 SINK-5-1	X											B		04/13/22	
13 SINK-5-2	X											B		04/13/22	

EREI establishes a unique Lab Sample ID, for each sample, by preceding each unique Client Sample ID with the laboratory RES Job Number.
EREI will analyze incoming samples based on information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing, client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall consitute an analytical services agreement with payment terms of NET 30 days. Failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By:		Dan Leung	Date/Time: 04/18/2022 13:33:19	Sample Condition: Acceptable
Received By:		Miria Wolf	Date/Time: 04/18/2022 13:43:58	Carrier: UPS

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

		REQUESTED ANALYSIS											VALID MATRIX CODES						LAB NOTES
													Air = A			Bulk = B			
													Dust = D			Food = F			
													Paint = P			Soil = S			
													Surface = SU			Swab = SW			
													Tape = T			Wipe = W			
													Drinking Water = DW						
													Waste Water = WW						
													ASTM E1792 approved wipe media only						
		PLM - PLM Short Report (EPA/600/R-93/116)	**TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	**PCM** - 7400A, 7400B, OSHA	**DUST** - Total, Respirable	**METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)**	**ORGANICS** - Methamphetamine, TSS	**VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	**MEDICAL** - Bioburden, LAL	**MOLD** - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	**Laboratory Analysis Instructions**
	Client Sample ID Number (Sample ID's must be unique)	**ASBESTOS**			**CHEMISTRY**			**MICROBIOLOGY**											
14	SINK-6-1	X												B		04/13/22		
15	SINK-6-2	X												B		04/13/22		
16	FIREDOOR-7-1	X												B		04/13/22		
17	FIREDOOR-7-2	X												B		04/13/22		
18	WLPL/CLPL-8-1	X												B		04/13/22		
19	WLPL/CLPL-8-2	X												B		04/13/22		
20	WLPL/CLPL-8-3	X												B		04/13/22		
21	12FLVCT/M-9-1	X												B		04/13/22		
22	12FLVCT/M-9-2	X												B		04/13/22		
23	12FLVCT/M-10-1	X												B		04/13/22		
24	12FLVCT/M-10-2	X												B		04/13/22		
25	CARMAS-11-1	X												B		04/13/22		
26	CARMAS-11-2	X												B		04/13/22		
27	WLPL/CLPL-12-1	X												B		04/13/22		
28	WLPL/CLPL-12-2	X												B		04/13/22		
29	WLPL/CLPL-12-3	X												B		04/13/22		
30	BBMAS-13-1	X												B		04/13/22		
31	BBMAS-13-2	X												B		04/13/22		
32	BBMAS-13-3	X												B		04/13/22		
33	CONC-14-1	X												B		04/13/22		
34	CONC-14-2	X												B		04/13/22		
35	CONC-14-3	X												B		04/13/22		
36	12FLVCT/M-15-1	X												B		04/13/22		
37	12FLVCT/M-15-2	X												B		04/13/22		
38	12FLVCT/M-15-3	X												B		04/13/22		
39	WLPL/CLPL-16-1	X												B		04/13/22		
40	WLPL/CLPL-16-2	X												B		04/13/22		
41	WLPL/CLPL-16-3	X												B		04/13/22		
42	WLPL/CLPL-16-4	X												B		04/13/22		
43	WLPL/CLPL-16-5	X												B		04/13/22		

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

		REQUESTED ANALYSIS											VALID MATRIX CODES						LAB NOTES
		PLM - PLM Short Report (EPA/600/R-93/116)	**TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	**PCM** - 7400A, 7400B, OSHA	**DUST** - Total, Respirable	**METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)**	**ORGANICS** - Methamphetamine, TSS	**VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	**MEDICAL** - Bioburden, LAL	**MOLD** - Spore Trap, Bulk Mold, Particulate Identification	Air = A	Bulk = B				
											Dust = D	Food = F						
											Paint = P	Soil = S						
											Surface = SU	Swab = SW						
											Tape = T	Wipe = W						
											Drinking Water = DW							
											Waste Water = WW							
											ASTM E1792 approved wipe media only							
	Client Sample ID Number (Sample ID's must be unique)										Sample Volume (L) / Area	Length (or Aliquots) x Width (or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	**Laboratory Analysis Instructions**	
		ASBESTOS			**CHEMISTRY**			**MICROBIOLOGY**										
44	BBMAS-17-1	X											B		04/13/22			
45	BBMAS-17-2	X											B		04/13/22			
46	BBMAS-17-3	X											B		04/13/22			
47	FORMICA-18-1	X											B		04/13/22			
48	FORMICA-18-2	X											B		04/13/22			
49	FORMICA-18-3	X											B		04/13/22			
50	SINK-19-1	X											B		04/13/22			
51	SINK-19-2	X											B		04/13/22			
52	CLGL-20-1	X											B		04/13/22			
53	CLGL-20-2	X											B		04/13/22			
54	WLCER-21-1	X											B		04/13/22			
55	WLCER-21-2	X											B		04/13/22			
56	9FLVCT/M-22-1	X											B		04/13/22			
57	9FLVCT/M-22-2	X											B		04/13/22			
58	SINK-23-1	X											B		04/13/22			
59	SINK-23-2	X											B		04/13/22			
60	SINK-24-1	X											B		04/13/22			
61	SINK-24-2	X											B		04/13/22			
62	12FLVCT/M-25-1	X											B		04/13/22			
63	12FLVCT/M-25-2	X											B		04/13/22			
64	12FLVCT/M-25-3	X											B		04/13/22			
65	CARMAS-26-1	X											B		04/13/22			
66	CARMAS-26-2	X											B		04/13/22			
67	WLPL/CLPL-27-1	X											B		04/13/22			
68	WLPL/CLPL-27-2	X											B		04/13/22			
69	WLPL/CLPL-27-3	X											B		04/13/22			
70	WLPL/CLPL-27-4	X											B		04/13/22			
71	WLPL/CLPL-27-5	X											B		04/13/22			
72	BBMAS-28-1	X											B		04/13/22			
73	BBMAS-28-2	X											B		04/13/22			

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

REQUESTED ANALYSIS									VALID MATRIX CODES						LAB NOTES
									Air = A			Bulk = B			
									Dust = D			Food = F			
									Paint = P			Soil = S			
									Surface = SU			Swab = SW			
									Tape = T			Wipe = W			
									Drinking Water = DW						
									Waste Water = WW						
									ASTM E1792 approved wipe media only						

Client Sample ID Number (Sample ID's must be unique)	**PLM - PLM Short Report (EPA/600/R-93/116)**	**TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	**PCM** - 7400A, 7400B, OSHA	**DUST** - Total, Respirable	**METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)**	**ORGANICS** - Methamphetamine, TSS	**VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/-, Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	**MEDICAL** - Bioburden, LAL	**MOLD** - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
	ASBESTOS			CHEMISTRY			MICROBIOLOGY									
74 BBMAS-28-3	X											B		04/13/22		
75 CLGL-29-1	X											B		04/13/22		
76 CLGL-29-2	X											B		04/13/22		
77 WLCER-30-1	X											B		04/13/22		
78 WLCER-30-2	X											B		04/13/22		
79 FORMICA-31-1	X											B		04/13/22		
80 FORMICA-31-2	X											B		04/13/22		
81 SINK-32-1	X											B		04/13/22		
82 SINK-32-2	X											B		04/13/22		
83 WLPL/CLPL-33-1	X											B		04/13/22		
84 WLPL/CLPL-33-2	X											B		04/13/22		
85 WLPL/CLPL-33-3	X											B		04/13/22		
86 WLPL/CLPL-34-1	X											B		04/13/22		
87 WLPL/CLPL-34-2	X											B		04/13/22		
88 WLPL/CLPL-34-3	X											B		04/13/22		
89 CLGL-35-1	X											B		04/13/22		
90 CLGL-35-2	X											B		04/13/22		
91 CLGL-35-3	X											B		04/13/22		
92 12FLVCT/M-36-1	X											B		04/13/22		
93 12FLVCT/M-36-2	X											B		04/13/22		
94 12FLVCT/M-36-3	X											B		04/13/22		
95 WLPL/CLPL-37-1	X											B		04/13/22		
96 WLPL/CLPL-37-2	X											B		04/13/22		
97 WLPL/CLPL-37-3	X											B		04/13/22		
98 BBMAS-38-1	X											B		04/13/22		
99 BBMAS-38-2	X											B		04/13/22		
100 BBMAS-38-3	X											B		04/13/22		
101 CLGL-39-1	X											B		04/13/22		
102 CLGL-39-2	X											B		04/13/22		
103 CLGL-39-3	X											B		04/13/22		

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS: PLM - PLM Short Report (EPA/600/R-93/116)	ASBESTOS: TEM - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	ASBESTOS: PCM - 7400A, 7400B, OSHA	CHEMISTRY: DUST - Total, Respirable	CHEMISTRY: METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)	CHEMISTRY: ORGANICS - Methamphetamine, TSS	MICROBIOLOGY: VIABLES - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	MICROBIOLOGY: MEDICAL - Bioburden, LAL	MICROBIOLOGY: MOLD - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length (or Aliquots) x Width (or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
104 CONC-40-1	X											B		04/13/22	
105 CONC-40-2	X											B		04/13/22	
106 12FLVCT/M-41-1	X											B		04/13/22	
107 12FLVCT/M-41-2	X											B		04/13/22	
108 12FLVCT/M-41-3	X											B		04/13/22	
109 CARMAS-42-1	X											B		04/13/22	
110 CARMAS-42-2	X											B		04/13/22	
111 BBMAS-43-1	X											B		04/13/22	
112 BBMAS-43-2	X											B		04/13/22	
113 CLLI-44-1	X											B		04/13/22	
114 CLLI-44-2	X											B		04/13/22	
115 CLLI-45-1	X											B		04/13/22	
116 CLLI-45-2	X											B		04/13/22	
117 CARMAS-46-1	X											B		04/13/22	
118 CARMAS-46-2	X											B		04/13/22	
119 12FLVCT/M-47-1	X											B		04/13/22	
120 12FLVCT/M-47-2	X											B		04/13/22	
121 BBMAS-48-1	X											B		04/13/22	
122 BBMAS-48-2	X											B		04/13/22	
123 FLCER-49-1	X											B		04/13/22	
124 FLCER-49-2	X											B		04/13/22	
125 WLPL/CLPL-50-1	X											B		04/13/22	
126 WLPL/CLPL-50-2	X											B		04/13/22	
127 WLPL/CLPL-50-3	X											B		04/13/22	
128 WLPL/CLPL-50-4	X											B		04/13/22	
129 WLPL/CLPL-50-5	X											B		04/13/22	
130 WLPL/CLPL-50-6	X											B		04/13/22	
131 WLPL/CLPL-50-7	X											B		04/13/22	
132 WLCER-51-1	X											B		04/13/22	
133 WLCER-51-2	X											B		04/13/22	

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS: PLM - PLM Short Report (EPA/600/R-93/116)	ASBESTOS: TEM - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	ASBESTOS: PCM - 7400A, 7400B, OSHA	CHEMISTRY: DUST - Total, Respirable	CHEMISTRY: METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)	CHEMISTRY: ORGANICS - Methamphetamine, TSS	MICROBIOLOGY: VIABLES - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	MICROBIOLOGY: MEDICAL - Bioburden, LAL	MICROBIOLOGY: MOLD - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length (or Aliquots) x Width (or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
134 CLTL-52-1	X											B		04/13/22	
135 CLTL-52-2	X											B		04/13/22	
136 9FLVCT/M-53-1	X											B		04/13/22	
137 9FLVCT/M-53-2	X											B		04/13/22	
138 BBMAS-54-1	X											B		04/13/22	
139 BBMAS-54-2	X											B		04/13/22	
140 CLGL-55-1	X											B		04/13/22	
141 CLGL-55-2	X											B		04/13/22	
142 CLSP-56-1	X											B		04/13/22	
143 CLSP-56-2	X											B		04/13/22	
144 12FLVCT/M-57-1	X											B		04/13/22	
145 12FLVCT/M-57-2	X											B		04/13/22	
146 12FLVCT/M-57-3	X											B		04/13/22	
147 PAINT-58-1	X											B		04/13/22	
148 PAINT-58-2	X											B		04/13/22	
149 PAINT-58-3	X											B		04/13/22	
150 BBMAS-59-1	X											B		04/13/22	
151 BBMAS-59-2	X											B		04/13/22	
152 BBMAS-59-3	X											B		04/13/22	
153 FORMCA-60-1	X											B		04/13/22	
154 FORMCA-60-2	X											B		04/13/22	
155 SINK-61-1	X											B		04/13/22	
156 SINK-61-2	X											B		04/13/22	
157 12FLVCT/M-62-1	X											B		04/13/22	
158 12FLVCT/M-62-2	X											B		04/13/22	
159 12FLVCT/M-62-3	X											B		04/13/22	
160 12FLVCT/M-62-4	X											B		04/13/22	
161 BBMAS-63-1	X											B		04/13/22	
162 BBMAS-63-2	X											B		04/13/22	
163 BBMAS-63-3	X											B		04/13/22	

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

LAB NOTES

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

REQUESTED ANALYSIS

- **PLM - PLM Short Report (EPA/600/R-93/116)**
- **TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera
- **PCM** - 7400A, 7400B, OSHA
- **DUST** - Total, Respirable
- **METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)**
- **ORGANICS** - Methamphetamine, TSS
- **VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/-, Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)
- **MEDICAL** - Bioburden, LAL
- **MOLD** - Spore Trap, Bulk Mold, Particulate Identification

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

LAB NOTES

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS: PLM	ASBESTOS: TEM	ASBESTOS: PCM	CHEMISTRY: DUST	CHEMISTRY: METALS	CHEMISTRY: ORGANICS	MICROBIOLOGY: VIABLES	MICROBIOLOGY: MEDICAL	MICROBIOLOGY: MOLD	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquo	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
164 BBMAS-63-4	X											B		04/13/22		
165 CLLI-64-1	X											B		04/13/22		
166 CLLI-64-2	X											B		04/13/22		
167 CLLI-64-3	X											B		04/13/22		
168 CLLI-64-4	X											B		04/13/22		
169 OW-1					X							P		04/13/22		
170 BL-2					X							P		04/13/22		
171 OW-3					X							P		04/13/22		
172 OW-4					X							P		04/13/22		
173 WLCER-21					X							P		04/13/22		
174 OW-5					X							P		04/13/22		
175 WLCER-30					X							P		04/13/22		
176 OW-6					X							P		04/13/22		
177 BL-7					X							P		04/13/22		
178 BE-8					X							P		04/13/22		
179 RD-9					X							P		04/13/22		
180 OW-10					X							P		04/13/22		
181 BL-11					X							P		04/13/22		

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
PI-1-1 Lab ID # 532-07636-001A	**None Detected**	1) 99-100% Fiberglass 2) None Detected 3) Jun-30-22 4) Jul-06-22	Insulation-Grey
PI-1-1 Lab ID # 532-07636-001B	**None Detected**	1) None Detected 2) 99-100% Other m.p. 3) 4) Jul-06-22	Caulk-White
PI-1-2 Lab ID # 532-07636-002A	**None Detected**	1) 99-100% Fiberglass 2) None Detected 3) Jun-30-22 4) Jul-06-22	Insulation-Grey
PI-1-2 Lab ID # 532-07636-002B	**None Detected**	1) None Detected 2) 99-100% Other m.p. 3) 4) Jul-06-22	Caulk-White
CLLI-2-1 Lab ID # 532-07636-003	**None Detected**	1) 5-10% Cellulose 2) 90-95% Opq, Other m.p. 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-White/Grey
CLLI-2-2 Lab ID # 532-07636-004	**None Detected**	1) 5-10% Cellulose 2) 90-95% Opq, Other m.p. 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-White/Grey
WL-3-1 Lab ID # 532-07636-005	**None Detected**	1) 99-100% Cellulose 2) None Detected 3) Jun-30-22 4) Jul-07-22	Wall Panel-Tan
WL-3-2 Lab ID # 532-07636-006	**None Detected**	1) 99-100% Cellulose 2) None Detected 3) Jun-30-22 4) Jul-07-22	Wall Panel-Tan
WLPL/CLPL-4-1 Lab ID # 532-07636-007A	**None Detected**	1) None Detected 2) 99-100% Qtz, Calc, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-4-1 Lab ID # 532-07636-007B	**None Detected**	1) None Detected 2) 99-100% Opq, Qtz 3) 4) Jul-07-22	Plaster-Off-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnetko

ASBESTOS TEM LABORATORIES, INC. **3431 Ettie St., Oakland, CA 94608** **(510) 704-8930**
www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
WLPL/CLPL-4-1 Lab ID # 532-07636-007C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-4-1 Lab ID # 532-07636-007D	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz 3) 4) Jul-07-22	Plaster-Grey
WLPL/CLPL-4-2 Lab ID # 532-07636-008A	**None Detected**	1) None Detected 2) 99-100% Qtz, Calc, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-4-2 Lab ID # 532-07636-008B	**None Detected**	1) None Detected 2) 99-100% Opq, Qtz 3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-4-2 Lab ID # 532-07636-008C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-4-2 Lab ID # 532-07636-008D	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz 3) 4) Jul-07-22	Plaster-Grey
WLPL/CLPL-4-3 Lab ID # 532-07636-009A	**None Detected**	1) None Detected 2) 99-100% Qtz, Calc, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-4-3 Lab ID # 532-07636-009B	**None Detected**	1) None Detected 2) 99-100% Opq, Qtz 3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-4-3 Lab ID # 532-07636-009C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-4-3 Lab ID # 532-07636-009D	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz 3) 4) Jul-07-22	Plaster-Grey

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnectos

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS %	ASBESTOS TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
CARMAS-5-1 Lab ID # 532-07636-010		**None Detected**	1) None Detected 2) 99-100% Glue 3) Jun-30-22 4) Jul-07-22	Mastic-blue
CARMAS-5-2 Lab ID # 532-07636-011		**None Detected**	1) None Detected 2) 99-100% Glue 3) Jun-30-22 4) Jul-07-22	Mastic-blue
FLVCT-6-1 Lab ID # 532-07636-012A		**None Detected**	1) None Detected 2) 99-100% Calc, Bndr 3) Jun-30-22 4) Jul-07-22	Floor Tile-blue
FLVCT-6-1 Lab ID # 532-07636-012B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Yellow
FLVCT-6-2 Lab ID # 532-07636-013A		**None Detected**	1) None Detected 2) 99-100% Calc, Bndr 3) Jun-30-22 4) Jul-07-22	Floor Tile-blue
FLVCT-6-2 Lab ID # 532-07636-013B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Yellow
BBMAS-7-1 Lab ID # 532-07636-014A		**None Detected**	1) None Detected 2) 99-100% Bndr, Calc 3) Jun-30-22 4) Jul-07-22	Baseboard-Blue
BBMAS-7-1 Lab ID # 532-07636-014B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Tan/White
BBMAS-7-2 Lab ID # 532-07636-015A		**None Detected**	1) None Detected 2) 99-100% Bndr, Calc 3) Jun-30-22 4) Jul-07-22	Baseboard-Blue
BBMAS-7-2 Lab ID # 532-07636-015B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Tan/White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnetko

ASBESTOS TEM LABORATORIES, INC. **3431 Ettie St., Oakland, CA 94608** **(510) 704-8930**
www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA 1) Non-Asbestos Fibers 2) Matrix Materials 3) Date/Time Collected 4) Date Analyzed	DESCRIPTION FIELD / LAB
WLSH/CLSH-8-1 Lab ID # 532-07636-016A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH/CLSH-8-1 Lab ID # 532-07636-016B	**None Detected**	1) None Detected 2) 99-100% Calc, QTz 3) 4) Jul-07-22	Joint Comp-White
WLSH/CLSH-8-1 Lab ID # 532-07636-016C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH/CLSH-8-2 Lab ID # 532-07636-017A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH/CLSH-8-2 Lab ID # 532-07636-017B	**None Detected**	1) None Detected 2) 99-100% Calc, QTz 3) 4) Jul-07-22	Joint Comp-White
WLSH/CLSH-8-2 Lab ID # 532-07636-017C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH/CLSH-8-3 Lab ID # 532-07636-018A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH/CLSH-8-3 Lab ID # 532-07636-018B	**None Detected**	1) None Detected 2) 99-100% Calc, QTz 3) 4) Jul-07-22	Joint Comp-White
WLSH/CLSH-8-3 Lab ID # 532-07636-018C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH/CLSH-8-4 Lab ID # 532-07636-019A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnectos

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
WLSH/CLSH-8-4 Lab ID # 532-07636-019B	**None Detected**	1) None Detected 2) 99-100% Calc, QTz 3) 4) Jul-07-22	Joint Comp-White
WLSH/CLSH-8-4 Lab ID # 532-07636-019C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH/CLSH-8-5 Lab ID # 532-07636-020A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH/CLSH-8-5 Lab ID # 532-07636-020B	**None Detected**	1) None Detected 2) 99-100% Calc, QTz 3) 4) Jul-07-22	Joint Comp-White
WLSH/CLSH-8-5 Lab ID # 532-07636-020C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH/CLSH-8-6 Lab ID # 532-07636-021A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH/CLSH-8-6 Lab ID # 532-07636-021B	**None Detected**	1) None Detected 2) 99-100% Calc, QTz 3) 4) Jul-07-22	Joint Comp-White
WLSH/CLSH-8-6 Lab ID # 532-07636-021C	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH/CLSH-8-7 Lab ID # 532-07636-022A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH/CLSH-8-7 Lab ID # 532-07636-022B	**None Detected**	1) None Detected 2) 99-100% Calc, QTz 3) 4) Jul-07-22	Joint Comp-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnetko

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS %	ASBESTOS TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
WLSH/CLSH-8-7 Lab ID # 532-07636-022C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
CAULK-9-1 Lab ID # 532-07636-023		**None Detected**	1) None Detected 2) 99-100% Calc 3) Jun-30-22 4) Jul-07-22	Caulk-White
CAULK-9-2 Lab ID # 532-07636-024		**None Detected**	1) None Detected 2) 99-100% Calc 3) Jun-30-22 4) Jul-07-22	Caulk-White
CLGL-10-1 Lab ID # 532-07636-025A		**None Detected**	1) 5-10% Fiberglass 2) 90-95% Opq, Other m.p. 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Grey
CLGL-10-1 Lab ID # 532-07636-025B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Yellow
CLGL-10-2 Lab ID # 532-07636-026A		**None Detected**	1) 5-10% Fiberglass 2) 90-95% Opq, Other m.p. 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Grey
CLGL-10-2 Lab ID # 532-07636-026B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Yellow
CL-11-1 Lab ID # 532-07636-027		**None Detected**	1) 99-100% Cellulose 2) None Detected 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Tan
CL-11-2 Lab ID # 532-07636-028		**None Detected**	1) 99-100% Cellulose 2) None Detected 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Tan
CL-12-1 Lab ID # 532-07636-029		**None Detected**	1) 99-100% Cellulose 2) None Detected 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Tan

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnectos

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS %	ASBESTOS TYPE	OTHER DATA 1) Non-Asbestos Fibers 2) Matrix Materials 3) Date/Time Collected 4) Date Analyzed	DESCRIPTION FIELD LAB
CL-12-2 Lab ID # 532-07636-030		**None Detected**	1) 99-100% Cellulose 2) None Detected 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Tan
BBMAS-13-1 Lab ID # 532-07636-031		**None Detected**	1) None Detected 2) 99-100% Glue 3) Jun-30-22 4) Jul-07-22	Mastic-Off-White
BBMAS-13-2 Lab ID # 532-07636-032		**None Detected**	1) None Detected 2) 99-100% Glue 3) Jun-30-22 4) Jul-07-22	Mastic-Off-White
BBMAS-13-3 Lab ID # 532-07636-033		**None Detected**	1) None Detected 2) 99-100% Glue 3) Jun-30-22 4) Jul-07-22	Mastic-Off-White
FLVCT-14-1 Lab ID # 532-07636-034A		**None Detected**	1) None Detected 2) 99-100% Calc, Bndr 3) Jun-30-22 4) Jul-07-22	Floor Tile-Off-White
FLVCT-14-1 Lab ID # 532-07636-034B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Yellow
FLVCT-14-1 Lab ID # 532-07636-034C		**None Detected**	1) None Detected 2) 99-100% Qtz, Calc 3) 4) Jul-07-22	LevelComp-Grey
FLVCT-14-2 Lab ID # 532-07636-035A		**None Detected**	1) None Detected 2) 99-100% Calc, Bndr 3) Jun-30-22 4) Jul-07-22	Floor Tile-Off-White
FLVCT-14-2 Lab ID # 532-07636-035B		**None Detected**	1) None Detected 2) 99-100% Glue 3) 4) Jul-07-22	Mastic-Yellow
FLVCT-14-2 Lab ID # 532-07636-035C		**None Detected**	1) None Detected 2) 99-100% Qtz, Calc 3) 4) Jul-07-22	LevelComp-Grey

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hinetos

ASBESTOS TEM LABORATORIES, INC. **3431 Ettie St., Oakland, CA 94608** **(510) 704-8930**
www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
FLVCT-15-1 Lab ID # 532-07636-036A	**None Detected**	1) None Detected 2) 99-100% Calc, Bndr 3) Jun-30-22 4) Jul-07-22	Floor Tile-Blue
FLVCT-15-1 Lab ID # 532-07636-036B	**None Detected**	1) None Detected 2) 99-100% Tar 3) 4) Jul-07-22	Mastic-Black
FLVCT-15-2 Lab ID # 532-07636-037A	**None Detected**	1) None Detected 2) 99-100% Calc, Bndr 3) Jun-30-22 4) Jul-07-22	Floor Tile-Blue
FLVCT-15-2 Lab ID # 532-07636-037B	**None Detected**	1) None Detected 2) 99-100% Tar 3) 4) Jul-07-22	Mastic-Black
WLCER-16-1 Lab ID # 532-07636-038A	**None Detected**	1) None Detected 2) 99-100% Qtz, Calc, Opq 3) Jun-30-22 4) Jul-07-22	CerTile-White
WLCER-16-1 Lab ID # 532-07636-038B	**None Detected**	1) None Detected 2) 99-100% Opq, Qtz, Calc 3) 4) Jul-07-22	Grout-Grey
WLCER-16-1 Lab ID # 532-07636-038C	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz 3) 4) Jul-07-22	Grout-Grey
WLCER-16-2 Lab ID # 532-07636-039A	**None Detected**	1) None Detected 2) 99-100% Qtz, Calc, Opq 3) Jun-30-22 4) Jul-07-22	CerTile-White
WLCER-16-2 Lab ID # 532-07636-039B	**None Detected**	1) None Detected 2) 99-100% Opq, Qtz, Calc 3) 4) Jul-07-22	Grout-Grey
WLCER-16-2 Lab ID # 532-07636-039C	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz 3) 4) Jul-07-22	Grout-Grey

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnectos

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
FLCER-17-1 Lab ID # 532-07636-040A	**None Detected**	1) None Detected 2) 99-100% Qtz, Calc, Opq 3) Jun-30-22 4) Jul-07-22	CerTile-Grey
FLCER-17-1 Lab ID # 532-07636-040B	**None Detected**	1) None Detected 2) 99-100% Opq, Qtz, Calc 3) 4) Jul-07-22	Grout-Grey
FLCER-17-1 Lab ID # 532-07636-040C	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz 3) 4) Jul-07-22	Grout-Grey
FLCER-17-2 Lab ID # 532-07636-041A	**None Detected**	1) None Detected 2) 99-100% Qtz, Calc, Opq 3) Jun-30-22 4) Jul-07-22	CerTile-White
FLCER-17-2 Lab ID # 532-07636-041B	**None Detected**	1) None Detected 2) 99-100% Opq, Qtz, Calc 3) 4) Jul-07-22	Grout-Grey
FLCER-17-2 Lab ID # 532-07636-041C	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz 3) 4) Jul-07-22	Grout-Grey
CLGL-18-1 Lab ID # 532-07636-042	**None Detected**	1) None Detected 2) 99-100% Opq, Bndr 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Grey
CLGL-18-2 Lab ID # 532-07636-043	**None Detected**	1) None Detected 2) 99-100% Opq, Bndr 3) Jun-30-22 4) Jul-07-22	Ceiling Tile-Grey
WLSH-19-1 Lab ID # 532-07636-044A	**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH-19-1 Lab ID # 532-07636-044B	**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Joint Comp-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnectos

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS %	ASBESTOS TYPE	OTHER DATA 1) Non-Asbestos Fibers 2) Matrix Materials 3) Date/Time Collected 4) Date Analyzed	DESCRIPTION FIELD LAB
WLSH-19-1 Lab ID # 532-07636-044C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH-19-2 Lab ID # 532-07636-045A		**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH-19-2 Lab ID # 532-07636-045B		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Joint Comp-White
WLSH-19-2 Lab ID # 532-07636-045C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLSH-19-3 Lab ID # 532-07636-046A		**None Detected**	1) None Detected 2) 99-100% Gyp 3) Jun-30-22 4) Jul-07-22	Drywall-White
WLSH-19-3 Lab ID # 532-07636-046B		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Joint Comp-White
WLSH-19-3 Lab ID # 532-07636-046C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Texture-White
WLPL/CLPL-20-1 Lab ID # 532-07636-047A		**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-20-1 Lab ID # 532-07636-047B		**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz 3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-20-1 Lab ID # 532-07636-047C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnectos

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS %	ASBESTOS TYPE	OTHER DATA 1) Non-Asbestos Fibers 2) Matrix Materials 3) Date/Time Collected 4) Date Analyzed	DESCRIPTION FIELD LAB
WLPL/CLPL-20-2 Lab ID # 532-07636-048A		**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-20-2 Lab ID # 532-07636-048B		**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz 3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-20-2 Lab ID # 532-07636-048C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-20-3 Lab ID # 532-07636-049A		**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-20-3 Lab ID # 532-07636-049B		**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz 3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-20-3 Lab ID # 532-07636-049C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-20-4 Lab ID # 532-07636-050A		**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-20-4 Lab ID # 532-07636-050B		**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz 3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-20-4 Lab ID # 532-07636-050C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-20-5 Lab ID # 532-07636-051A		**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnatko

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
WLPL/CLPL-20-5	**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz	
Lab ID # 532-07636-051B		3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-20-5	**None Detected**	1) None Detected 2) 99-100% Calc	
Lab ID # 532-07636-051C		3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-21-1	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq	
Lab ID # 532-07636-052A		3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-21-1	**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz	
Lab ID # 532-07636-052B		3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-21-1	**None Detected**	1) None Detected 2) 99-100% Calc	
Lab ID # 532-07636-052C		3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-21-2	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq	
Lab ID # 532-07636-053A		3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-21-2	**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz	
Lab ID # 532-07636-053B		3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-21-2	**None Detected**	1) None Detected 2) 99-100% Calc	
Lab ID # 532-07636-053C		3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-21-3	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq	
Lab ID # 532-07636-054A		3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-21-3	**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz	
Lab ID # 532-07636-054B		3) 4) Jul-07-22	Plaster-Off-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnetko

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS % TYPE	OTHER DATA (1) Non-Asbestos Fibers (2) Matrix Materials (3) Date/Time Collected (4) Date Analyzed	DESCRIPTION FIELD / LAB
WLPL/CLPL-21-3	**None Detected**	1) None Detected 2) 99-100% Calc	
Lab ID # 532-07636-054C		3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-21-4	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq	
Lab ID # 532-07636-055A		3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-21-4	**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz	
Lab ID # 532-07636-055B		3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-21-4	**None Detected**	1) None Detected 2) 99-100% Calc	
Lab ID # 532-07636-055C		3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-21-5	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq	
Lab ID # 532-07636-056A		3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-21-5	**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz	
Lab ID # 532-07636-056B		3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-21-5	**None Detected**	1) None Detected 2) 99-100% Calc	
Lab ID # 532-07636-056C		3) 4) Jul-07-22	Skim Coat-White
WLPL/CLPL-21-6	**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq	
Lab ID # 532-07636-057A		3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-21-6	**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz	
Lab ID # 532-07636-057B		3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-21-6	**None Detected**	1) None Detected 2) 99-100% Calc	
Lab ID # 532-07636-057C		3) 4) Jul-07-22	Skim Coat-White

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnetko

POLARIZED LIGHT MICROSCOPY
ANALYTICAL REPORT

EPA Method 600/R-93/116 or 600/M4-82-020

Contact: Dan Leung

Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Indicated: 62
Reg. Samples Analyzed: 62
Split Layers Analyzed: 77

Job Site / No. Tennyson HS
B13490.02-DL

Report No. **379487**
Date Submitted: Jun-30-22
Date Reported: Jul-07-22

SAMPLE ID	ASBESTOS %	ASBESTOS TYPE	OTHER DATA 1) Non-Asbestos Fibers 2) Matrix Materials 3) Date/Time Collected 4) Date Analyzed	DESCRIPTION FIELD LAB
WLPL/CLPL-21-7 Lab ID # 532-07636-058A		**None Detected**	1) None Detected 2) 99-100% Calc, Qtz, Opq 3) Jun-30-22 4) Jul-07-22	Plaster-White
WLPL/CLPL-21-7 Lab ID # 532-07636-058B		**None Detected**	1) None Detected 2) 99-100% Opq, Calc, Qtz 3) 4) Jul-07-22	Plaster-Off-White
WLPL/CLPL-21-7 Lab ID # 532-07636-058C		**None Detected**	1) None Detected 2) 99-100% Calc 3) 4) Jul-07-22	Skim Coat-White
CAULK-22-1 Lab ID # 532-07636-059		**None Detected**	1) None Detected 2) 99-100% Calc, Opq 3) Jun-30-22 4) Jul-07-22	Caulk-Grey
CAULK-22-2 Lab ID # 532-07636-060		**None Detected**	1) None Detected 2) 99-100% Calc, Opq 3) Jun-30-22 4) Jul-07-22	Caulk-Grey
WLCER-23-1 Lab ID # 532-07636-061A		**None Detected**	1) None Detected 2) 99-100% Opq, Qtz, Calc 3) Jun-30-22 4) Jul-07-22	CerTile-White
WLCER-23-1 Lab ID # 532-07636-061B		**None Detected**	1) None Detected 2) 99-100% Qtz, Calc 3) 4) Jul-07-22	Grout-Grey
WLCER-23-2 Lab ID # 532-07636-062A		**None Detected**	1) None Detected 2) 99-100% Opq, Qtz, Calc 3) Jun-30-22 4) Jul-07-22	CerTile-White
WLCER-23-2 Lab ID # 532-07636-062B		**None Detected**	1) None Detected 2) 99-100% Qtz, Calc 3) 4) Jul-07-22	Grout-Grey
Lab ID #			1) 2) 3) 4)	

Detection Limit of Method is Estimated to be 1% Asbestos Using a Visual Area Estimation Technique

Analyst Jo Ann Hnetko

CHAIN OF CUSTODY FORM

Bill to: SCA

Email report/~~COC~~/~~Invoice~~ to:
dleung@sca-enviro.com (PROJ MGR)
shuang@sca-enviro.com (TECH)
labreports99@gmail.com (ACCT)

EMAIL HEADING: (Project #) - (Project Manager Initials) - (Site Name/Address) - (Date MMDD)

B13490.02 | DL | Tennyson HS | 6/30

LAB ATEM

COURIER
LAB REP NOTIFIED: | Notification DATE/TIME:
COURIER (UPS, SPC T,...) | LAST 5 OF TRACKING NUMBER:
EST ARRIVAL DATE: | EST. ARRIVAL TIME:

INSTRUCTIONS TO LAB:

Method Reference: 7400 PCM | AHERA TEM (≤0.005 s/cc AnaSen) | CARB-AHERA TEM 0.001 s/cc Ana Sensitivity
PLM (asbestos) | Flame AA (Lead) | ICP (Lead)
Sample Media: ☐25 ☐37 mm | ☐ 0.45 ☐0.8 micron | ☐MCEF ☐Bulk ☐Water ☐Wipe

RESULTS DUE: 3 Days | AM / PM

CHAIN OF CUSTODY DATA:
Sending Info: 62 samples submitted by SH on 6/30 at ____
Received by Lab: 62 samples received by MB on 6/30 at 1105
Received by Analyst: ____ samples received by ____ on ____ at ____

SAMPLE ID	LITERS	Description	Ins/Blanks/Outs
PT-1-1,2		FLCER-17-1,2	
CLT-2-1,2		CLGL-18-1,2	
WL-3-1,2		WLSH-19-1,2,3	
WLPL/CLPL-4-1,2,3		WLPL/CLPL-20-1,2,3,4,5	
CARMAS-5-1,2		~~CLGL~~ WLPL/CLPL-21-1,2,3,4,5,6,7	
FLVCT-6-1,2		CAWLK-22-1,2	
BBMAS-7-1,2		WLCER-23-1,2	
WLSH/CLSH-8-1,2,3,4,5,6,7			
CAWLK-9-1,2			
CLGL-10-1,2			
CL-11-1,2			
CL-12-1,2			
BBMAS-13-1,2,3			
FLVCT-14-1,2			
FLVCT-15-1,2			
WLCER-16-1,2			
	0 LITERS		BLANK
	0 LITERS		BLANK
	0 LITERS		BLANK

Supplies/Equipment	Qty
Hi-Vol Pumps (3040)	
Lo-Vol Pumps (3020)	
TEM / Pb cassettes (3520)	
PCM cassettes (3500)	
Bulk sampling supply (3710)	62
Lead Wipes (3266)	
Legionella Bottles (3742)	
Water Bottles (Pb/other) (3743)	
Mold Cassettes (3522)	
Smoke Tubes (3540)	
Matched Weight Cassette (3521)	

INSTRUCTIONS TO LAB (delete items not applicable AND circle items applicable):
1. Pickup requested:
   Contact: _____
   Time of Call: _____
2. **Call contact to acknowledge receipt of samples.**
3. **Analyze samples by PCM only.**
4. Analyze inside samples by PCM first; if any sample >0.01 f/cc, contact project manager.
5. **If all samples are <0.01 f/cc, proceed with items 6, 7 or 8, as noted.**
6. Analyze inside samples only; stop if Avg >70 str/mm^2, contact PM before analyzing outsides or blanks.
7. **Analyze all samples, including outside samples and blanks.**
8. **Do NOT analyze outside or blank samples.**
9. **Analyze by TEM only the inside air sample with the highest PCM result.**
10. Serial analysis; stop at first positive (>1%); first trace (<0.1%);except sheetrock and plaster samples.
11. **Analyze all bulk samples, unless otherwise indicated.**
12. **PCB: <0.05mg/kg detection limit required. Authorized to perform cleanup to meet the detection limit.**
13. _____

Report Number: 379487

Invoice Number:

Attachment 2

Lead Laboratory Reports

eurofins | Built Environment Reservoirs

April 25, 2022

Subcontractor Number:
Laboratory Report: **RES 522783-2**
Project #/P.O. #: **B-13490.02**
Project Description: **HUSD Tennyson HS Pre-Renovation Hazmat Survey**

Dan Leung
SCA Environmental, Inc.
320 Justin Drive
San Francisco CA 94112

Dear Dan,

Eurofins Reservoirs is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the American Industrial Hygiene Association (AIHA LAP, LLC), Lab ID 101533. The laboratory is currently proficient in both IHPAT & ELPAT programs respectively.

Eurofins Reservoirs has analyzed the following sample(s) using Atomic Absorption Spectroscopy (AAS) / Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) per your request. Reported sample results were not blank corrected. The analysis has been completed in general accordance with the appropriate methodology as stated in the analysis table. Results have been sent to your office.

RES 522783-2 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Eurofins Reservoirs will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed, as received by the customer. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Eurofins Reservoirs Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Robin S Klover
by Jeff Green

Robin Klover
Vice President

DATA QA
04/25/2022

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: LEAD IN PAINT

RES Job Number:	**RES 522783-2**
Client:	**SCA Environmental, Inc.**
Client Project/P.O.:	**B-13490.02**
Client Project Description:	**HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received:	**April 18, 2022**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**April 19, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Laboratory Sample ID	Client ID Number	Reporting Limit (%)	LEAD CONCENTRATION (%)
522783 -	OW-1	0.0048	0.0083
522783 -	BL-2	0.0038	BRL
522783 -	OW-3	0.0049	BRL
522783 -	OW-4	0.0047	0.0083
522783 -	WLCER-21	0.024	0.11
522783 -	OW-5	0.0050	BRL
522783 -	WLCER-30	0.024	0.34
522783 -	OW-6	0.0050	0.13
522783 -	BL-7	0.54	5.5
522783 -	BE-8	0.0048	0.078
522783 -	RD-9	0.0059	0.11
522783 -	OW-10	0.0046	BRL
522783 -	BL-11	0.0049	0.012

Unless otherwise noted on the QC table, all quality control samples performed within specifications established by the laboratory

Unless otherwise noted sample analyses have not been blank corrected

100X dilution was required on sample: BL-7 for analytes Pb;

10X dilution was required on sample: WLCER-21 for analytes Pb; sample: WLCER-30 for analytes Pb;

For all samples requiring increased dilutions, the reporting limit has been adjusted accordingly.



Analyst

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: LEAD IN PAINT

RES Job Number:	**RES 522783-2**
Client:	**SCA Environmental, Inc.**
Client Project/P.O.:	**B-13490.02**
Client Project Description:	**HUSD Tennyson HS Pre-Renovation Hazmat Survey**
Date Samples Received:	**April 18, 2022**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**April 19, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Quality Control Batch	Analyte	Matrix Blank (µg)	Matrix Duplicate (%RPD)	Matrix Spike (% Recovery)	Laboratory Control Sample (% Recovery)
041822-6	Pb	BRL	0	110	106

Unless otherwise noted all quality control samples performed within specifications established by the laboratory.

Unless otherwise noted sample analyses have not been blank corrected



Analyst

eurofins | Built Environment Reservoirs

RES Job #: 522783

SUBMITTED BY		INVOICE TO		CONTACT INFORMATION		SERIES
Company:	SCA Environmental, Inc.	Company:	SCA Environmental, Inc.	Contact:	Dan Leung	-1 PLM Standard 3
Address:	320 Justin Drive	Address:	320 Justin Drive	Phone:	(415) 882-1675	-2 Chem Standard
				Fax:		
	San Francisco, CA 94112		San Francisco, CA 94112	Cell:	(415) 867-9544	
Project Number and/or P.O. #:	B-13490.02			Final Data Deliverable Email Address:		
Project Description/Location:	HUSD Tennyson HS Pre-Renovation Hazmat Survey			dleung@sca-enviro.com (+ 1 ADDNL. CONTACTS)		

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm & Sat. 8am - 5pm

PLM / PCM / TEM — DTL RUSH PRIORITY STANDARD

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Dust — RUSH PRIORITY STANDARD

Metals — RUSH PRIORITY STANDARD

*PRIOR NOTICE REQUIRED FOR SAME DAY TAT

Organics* — SAME DAY RUSH PRIORITY STANDARD

MICROBIOLOGY LABORATORY HOURS: Weekdays: 8am - 5pm

Viable Analysis** — PRIORITY STANDARD

**TAT DEPENDENT ON SPEED OF MICROBIAL GROWTH

Medical Device Analysis — RUSH STANDARD

Mold Analysis — RUSH PRIORITY STANDARD

****Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.****

Special Instructions:

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

Client Sample ID Number (Sample ID's must be unique)	PLM - PLM Short Report (EPA/600/R-93/116)	TEM - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-. CARB Modified Ahera	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)	ORGANICS - Methamphetamine, TSS	VIABLES - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/-, Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	MEDICAL - Bioburden, LAL	MOLD - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
	ASBESTOS			CHEMISTRY			MICROBIOLOGY								
1 12FLVCT/M-1-1	X											B		04/13/22	
2 12FLVCT/M-1-2	X											B		04/13/22	
3 12FLVCT/M-1-3	X											B		04/13/22	
4 WLSH/CLSH-2-1	X											B		04/13/22	
5 WLSH/CLSH-2-2	X											B		04/13/22	
6 WLSH/CLSH-2-3	X											B		04/13/22	
7 BBMAS-3-1	X											B		04/13/22	
8 BBMAS-3-2	X											B		04/13/22	
9 BBMAS-3-3	X											B		04/13/22	
10 FORMICA-4-1	X											B		04/13/22	
11 FORMICA-4-2	X											B		04/13/22	
12 SINK-5-1	X											B		04/13/22	
13 SINK-5-2	X											B		04/13/22	

EREI establishes a unique Lab Sample ID, for each sample, by preceding each unique Client Sample ID with the laboratory RES Job Number.
EREI will analyze incoming samples based on information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing, client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall consitute an analytical services agreement with payment terms of NET 30 days. Failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By:		Dan Leung	Date/Time: 04/18/2022 13:33:19	Sample Condition: Acceptable
Received By:		Miria Wolf	Date/Time: 04/18/2022 13:43:58	Carrier: UPS

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

		REQUESTED ANALYSIS											VALID MATRIX CODES						LAB NOTES
													Air = A			Bulk = B			
													Dust = D			Food = F			
													Paint = P			Soil = S			
													Surface = SU			Swab = SW			
													Tape = T			Wipe = W			
													Drinking Water = DW						
													Waste Water = WW						
													ASTM E1792 approved wipe media only						
		PLM - PLM Short Report (EPA/600/R-93/116)	**TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	**PCM** - 7400A, 7400B, OSHA	**DUST** - Total, Respirable	**METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)**	**ORGANICS** - Methamphetamine, TSS	**VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	**MEDICAL** - Bioburden, LAL	**MOLD** - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	**Laboratory Analysis Instructions**
	Client Sample ID Number (Sample ID's must be unique)	**ASBESTOS**			**CHEMISTRY**			**MICROBIOLOGY**											
14	SINK-6-1	X												B		04/13/22		
15	SINK-6-2	X												B		04/13/22		
16	FIREDOOR-7-1	X												B		04/13/22		
17	FIREDOOR-7-2	X												B		04/13/22		
18	WLPL/CLPL-8-1	X												B		04/13/22		
19	WLPL/CLPL-8-2	X												B		04/13/22		
20	WLPL/CLPL-8-3	X												B		04/13/22		
21	12FLVCT/M-9-1	X												B		04/13/22		
22	12FLVCT/M-9-2	X												B		04/13/22		
23	12FLVCT/M-10-1	X												B		04/13/22		
24	12FLVCT/M-10-2	X												B		04/13/22		
25	CARMAS-11-1	X												B		04/13/22		
26	CARMAS-11-2	X												B		04/13/22		
27	WLPL/CLPL-12-1	X												B		04/13/22		
28	WLPL/CLPL-12-2	X												B		04/13/22		
29	WLPL/CLPL-12-3	X												B		04/13/22		
30	BBMAS-13-1	X												B		04/13/22		
31	BBMAS-13-2	X												B		04/13/22		
32	BBMAS-13-3	X												B		04/13/22		
33	CONC-14-1	X												B		04/13/22		
34	CONC-14-2	X												B		04/13/22		
35	CONC-14-3	X												B		04/13/22		
36	12FLVCT/M-15-1	X												B		04/13/22		
37	12FLVCT/M-15-2	X												B		04/13/22		
38	12FLVCT/M-15-3	X												B		04/13/22		
39	WLPL/CLPL-16-1	X												B		04/13/22		
40	WLPL/CLPL-16-2	X												B		04/13/22		
41	WLPL/CLPL-16-3	X												B		04/13/22		
42	WLPL/CLPL-16-4	X												B		04/13/22		
43	WLPL/CLPL-16-5	X												B		04/13/22		

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

		REQUESTED ANALYSIS											VALID MATRIX CODES						LAB NOTES
		PLM - PLM Short Report (EPA/600/R-93/116)	**TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	**PCM** - 7400A, 7400B, OSHA	**DUST** - Total, Respirable	**METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)**	**ORGANICS** - Methamphetamine, TSS	**VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	**MEDICAL** - Bioburden, LAL	**MOLD** - Spore Trap, Bulk Mold, Particulate Identification	Air = A	Bulk = B				
											Dust = D	Food = F						
											Paint = P	Soil = S						
											Surface = SU	Swab = SW						
											Tape = T	Wipe = W						
											Drinking Water = DW							
											Waste Water = WW							
											ASTM E1792 approved wipe media only							
	Client Sample ID Number (Sample ID's must be unique)										Sample Volume (L) / Area	Length (or Aliquots) x Width (or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	**Laboratory Analysis Instructions**	
		ASBESTOS			**CHEMISTRY**			**MICROBIOLOGY**										
44	BBMAS-17-1	X											B		04/13/22			
45	BBMAS-17-2	X											B		04/13/22			
46	BBMAS-17-3	X											B		04/13/22			
47	FORMICA-18-1	X											B		04/13/22			
48	FORMICA-18-2	X											B		04/13/22			
49	FORMICA-18-3	X											B		04/13/22			
50	SINK-19-1	X											B		04/13/22			
51	SINK-19-2	X											B		04/13/22			
52	CLGL-20-1	X											B		04/13/22			
53	CLGL-20-2	X											B		04/13/22			
54	WLCER-21-1	X											B		04/13/22			
55	WLCER-21-2	X											B		04/13/22			
56	9FLVCT/M-22-1	X											B		04/13/22			
57	9FLVCT/M-22-2	X											B		04/13/22			
58	SINK-23-1	X											B		04/13/22			
59	SINK-23-2	X											B		04/13/22			
60	SINK-24-1	X											B		04/13/22			
61	SINK-24-2	X											B		04/13/22			
62	12FLVCT/M-25-1	X											B		04/13/22			
63	12FLVCT/M-25-2	X											B		04/13/22			
64	12FLVCT/M-25-3	X											B		04/13/22			
65	CARMAS-26-1	X											B		04/13/22			
66	CARMAS-26-2	X											B		04/13/22			
67	WLPL/CLPL-27-1	X											B		04/13/22			
68	WLPL/CLPL-27-2	X											B		04/13/22			
69	WLPL/CLPL-27-3	X											B		04/13/22			
70	WLPL/CLPL-27-4	X											B		04/13/22			
71	WLPL/CLPL-27-5	X											B		04/13/22			
72	BBMAS-28-1	X											B		04/13/22			
73	BBMAS-28-2	X											B		04/13/22			

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

REQUESTED ANALYSIS | **VALID MATRIX CODES** | **LAB NOTES**

VALID MATRIX CODES	
Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS: PLM - PLM Short Report (EPA/600/R-93/116)	ASBESTOS: TEM - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	ASBESTOS: PCM - 7400A, 7400B, OSHA	CHEMISTRY: DUST - Total, Respirable	CHEMISTRY: METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)	CHEMISTRY: ORGANICS - Methamphetamine, TSS	MICROBIOLOGY: VIABLES - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/-, Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	MICROBIOLOGY: MEDICAL - Bioburden, LAL	MICROBIOLOGY: MOLD - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
74 BBMAS-28-3	X											B		04/13/22		
75 CLGL-29-1	X											B		04/13/22		
76 CLGL-29-2	X											B		04/13/22		
77 WLCER-30-1	X											B		04/13/22		
78 WLCER-30-2	X											B		04/13/22		
79 FORMICA-31-1	X											B		04/13/22		
80 FORMICA-31-2	X											B		04/13/22		
81 SINK-32-1	X											B		04/13/22		
82 SINK-32-2	X											B		04/13/22		
83 WLPL/CLPL-33-1	X											B		04/13/22		
84 WLPL/CLPL-33-2	X											B		04/13/22		
85 WLPL/CLPL-33-3	X											B		04/13/22		
86 WLPL/CLPL-34-1	X											B		04/13/22		
87 WLPL/CLPL-34-2	X											B		04/13/22		
88 WLPL/CLPL-34-3	X											B		04/13/22		
89 CLGL-35-1	X											B		04/13/22		
90 CLGL-35-2	X											B		04/13/22		
91 CLGL-35-3	X											B		04/13/22		
92 12FLVCT/M-36-1	X											B		04/13/22		
93 12FLVCT/M-36-2	X											B		04/13/22		
94 12FLVCT/M-36-3	X											B		04/13/22		
95 WLPL/CLPL-37-1	X											B		04/13/22		
96 WLPL/CLPL-37-2	X											B		04/13/22		
97 WLPL/CLPL-37-3	X											B		04/13/22		
98 BBMAS-38-1	X											B		04/13/22		
99 BBMAS-38-2	X											B		04/13/22		
100 BBMAS-38-3	X											B		04/13/22		
101 CLGL-39-1	X											B		04/13/22		
102 CLGL-39-2	X											B		04/13/22		
103 CLGL-39-3	X											B		04/13/22		

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS: PLM - PLM Short Report (EPA/600/R-93/116)	ASBESTOS: TEM - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	ASBESTOS: PCM - 7400A, 7400B, OSHA	CHEMISTRY: DUST - Total, Respirable	CHEMISTRY: METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)	CHEMISTRY: ORGANICS - Methamphetamine, TSS	MICROBIOLOGY: VIABLES - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	MICROBIOLOGY: MEDICAL - Bioburden, LAL	MICROBIOLOGY: MOLD - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length (or Aliquots) x Width (or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
104 CONC-40-1	X											B		04/13/22	
105 CONC-40-2	X											B		04/13/22	
106 12FLVCT/M-41-1	X											B		04/13/22	
107 12FLVCT/M-41-2	X											B		04/13/22	
108 12FLVCT/M-41-3	X											B		04/13/22	
109 CARMAS-42-1	X											B		04/13/22	
110 CARMAS-42-2	X											B		04/13/22	
111 BBMAS-43-1	X											B		04/13/22	
112 BBMAS-43-2	X											B		04/13/22	
113 CLLI-44-1	X											B		04/13/22	
114 CLLI-44-2	X											B		04/13/22	
115 CLLI-45-1	X											B		04/13/22	
116 CLLI-45-2	X											B		04/13/22	
117 CARMAS-46-1	X											B		04/13/22	
118 CARMAS-46-2	X											B		04/13/22	
119 12FLVCT/M-47-1	X											B		04/13/22	
120 12FLVCT/M-47-2	X											B		04/13/22	
121 BBMAS-48-1	X											B		04/13/22	
122 BBMAS-48-2	X											B		04/13/22	
123 FLCER-49-1	X											B		04/13/22	
124 FLCER-49-2	X											B		04/13/22	
125 WLPL/CLPL-50-1	X											B		04/13/22	
126 WLPL/CLPL-50-2	X											B		04/13/22	
127 WLPL/CLPL-50-3	X											B		04/13/22	
128 WLPL/CLPL-50-4	X											B		04/13/22	
129 WLPL/CLPL-50-5	X											B		04/13/22	
130 WLPL/CLPL-50-6	X											B		04/13/22	
131 WLPL/CLPL-50-7	X											B		04/13/22	
132 WLCER-51-1	X											B		04/13/22	
133 WLCER-51-2	X											B		04/13/22	

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

eurofins | Built Environment Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS: PLM - PLM Short Report (EPA/600/R-93/116)	ASBESTOS: TEM - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	ASBESTOS: PCM - 7400A, 7400B, OSHA	CHEMISTRY: DUST - Total, Respirable	CHEMISTRY: METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)	CHEMISTRY: ORGANICS - Methamphetamine, TSS	MICROBIOLOGY: VIABLES - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	MICROBIOLOGY: MEDICAL - Bioburden, LAL	MICROBIOLOGY: MOLD - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length (or Aliquots) x Width (or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
134 CLTL-52-1	X											B		04/13/22	
135 CLTL-52-2	X											B		04/13/22	
136 9FLVCT/M-53-1	X											B		04/13/22	
137 9FLVCT/M-53-2	X											B		04/13/22	
138 BBMAS-54-1	X											B		04/13/22	
139 BBMAS-54-2	X											B		04/13/22	
140 CLGL-55-1	X											B		04/13/22	
141 CLGL-55-2	X											B		04/13/22	
142 CLSP-56-1	X											B		04/13/22	
143 CLSP-56-2	X											B		04/13/22	
144 12FLVCT/M-57-1	X											B		04/13/22	
145 12FLVCT/M-57-2	X											B		04/13/22	
146 12FLVCT/M-57-3	X											B		04/13/22	
147 PAINT-58-1	X											B		04/13/22	
148 PAINT-58-2	X											B		04/13/22	
149 PAINT-58-3	X											B		04/13/22	
150 BBMAS-59-1	X											B		04/13/22	
151 BBMAS-59-2	X											B		04/13/22	
152 BBMAS-59-3	X											B		04/13/22	
153 FORMCA-60-1	X											B		04/13/22	
154 FORMCA-60-2	X											B		04/13/22	
155 SINK-61-1	X											B		04/13/22	
156 SINK-61-2	X											B		04/13/22	
157 12FLVCT/M-62-1	X											B		04/13/22	
158 12FLVCT/M-62-2	X											B		04/13/22	
159 12FLVCT/M-62-3	X											B		04/13/22	
160 12FLVCT/M-62-4	X											B		04/13/22	
161 BBMAS-63-1	X											B		04/13/22	
162 BBMAS-63-2	X											B		04/13/22	
163 BBMAS-63-3	X											B		04/13/22	

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

LAB NOTES

eurofins

Built Environment
Reservoirs

Res Job#: **522783**

Submitted By: **SCA Environmental, Inc.**

REQUESTED ANALYSIS								
PLM - PLM Short Report (EPA/600/R-93/116)	**TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	**PCM** - 7400A, 7400B, OSHA	**DUST** - Total, Respirable	**METALS - Analyte(s) Pb Lead by Flame AA (USEPA SW846 3050B/7420)**	**ORGANICS** - Methamphetamine, TSS	**VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/-, Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	**MEDICAL** - Bioburden, LAL	**MOLD** - Spore Trap, Bulk Mold, Particulate Identification

VALID MATRIX CODES	
Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS: PLM	ASBESTOS: TEM	ASBESTOS: PCM	CHEMISTRY: DUST	CHEMISTRY: METALS	CHEMISTRY: ORGANICS	MICROBIOLOGY: VIABLES	MICROBIOLOGY: MEDICAL	MICROBIOLOGY: MOLD	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	LAB NOTES: Laboratory Analysis Instructions
164 BBMAS-63-4	X											B		04/13/22		
165 CLLI-64-1	X											B		04/13/22		
166 CLLI-64-2	X											B		04/13/22		
167 CLLI-64-3	X											B		04/13/22		
168 CLLI-64-4	X											B		04/13/22		
169 OW-1					X							P		04/13/22		
170 BL-2					X							P		04/13/22		
171 OW-3					X							P		04/13/22		
172 OW-4					X							P		04/13/22		
173 WLCER-21					X							P		04/13/22		
174 OW-5					X							P		04/13/22		
175 WLCER-30					X							P		04/13/22		
176 OW-6					X							P		04/13/22		
177 BL-7					X							P		04/13/22		
178 BE-8					X							P		04/13/22		
179 RD-9					X							P		04/13/22		
180 OW-10					X							P		04/13/22		
181 BL-11					X							P		04/13/22		

ATOMIC ABSORPTION SPECTROSCOPY
LEAD PAINT ANALYSIS REPORT
ATEM SOP-AA-01 (EPA 3050B / EPA 7000B)

Contact: Dan Leung
Address: SCA Environmental, Inc.
320 Justin Drive
San Francisco, CA 94112

Samples Submitted: 6
Samples Analyzed: 6
Job Site / No.
Tennyson HS
B13490.02-DL

Report No.: **379476**
Date Submitted: Jun-30-22
Date Reported: Jul-06-22

SAMPLE ID	METAL	SAMPLE RESULT	REPORTING LIMIT	LOCATION / DESCRIPTION		
BLUE-1 Lab ID # 532-07632-001	Pb	**< 49 mg/kg** < 0.005 %	**49 mg/kg** 0.005 %	Sampling Date Jun-30-22	Analysis Date Jul-06-22	Analyzed Weight (g) 0.2041
OW-2 Lab ID # 532-07632-002	Pb	**35000 mg/kg** 3.500 %	**78 mg/kg** 0.008 %	Sampling Date Jun-30-22	Analysis Date Jul-06-22	Analyzed Weight (g) 0.1289
OW-3 Lab ID # 532-07632-003	Pb	**< 49 mg/kg** < 0.005 %	**49 mg/kg** 0.005 %	Sampling Date Jun-30-22	Analysis Date Jul-06-22	Analyzed Weight (g) 0.2021
OW-4 Lab ID # 532-07632-004	Pb	**87 mg/kg** 0.009 %	**50 mg/kg** 0.005 %	Sampling Date Jun-30-22	Analysis Date Jul-06-22	Analyzed Weight (g) 0.2019
WLCER-16 Lab ID # 532-07632-005	Pb	**< 42 mg/kg** < 0.004 %	**42 mg/kg** 0.004 %	Sampling Date Jun-30-22	Analysis Date Jul-06-22	Analyzed Weight (g) 0.2359
WLCER-23 Lab ID # 532-07632-006	Pb	**210 mg/kg** 0.021 %	**48 mg/kg** 0.005 %	Sampling Date Jun-30-22	Analysis Date Jul-06-22	Analyzed Weight (g) 0.2077
Lab ID #				Sampling Date	Analysis Date	Analyzed Weight (g)
Lab ID #				Sampling Date	Analysis Date	Analyzed Weight (g)
Lab ID #				Sampling Date	Analysis Date	Analyzed Weight (g)
Lab ID #				Sampling Date	Analysis Date	Analyzed Weight (g)

Analytical results posted above relate only to the material(s) tested.
The sample has not been blank corrected.

µg - micrograms **1% = 10,000 ppm** **1ppm = 1 mg/Kg**

Lab QC Reviewer Jo Ann Huerto — **Jo Ann Huerto**

Analyst Jie Zhang — **Jie Zhang**

CHAIN OF CUSTODY FORM

Bill to: SCA

Email report/COC/Invoiceto:
dleung@sca-enviro.com (PROJ MGR)
shuang@sca-enviro.com (TECH)
labreports99@gmail.com (ACCT)

INSTRUCTIONSTO LAB:

EMAIL HEADING:	(Project #) -	(Project Manager Initials) -	(Site Name/Address) -	(Date MMDD)
	[redacted]B13490.02	DL	Tennyson HS	6/30

LAB ATEM

COURIER			
LAB REP NOTIFIED:		Notification DATE/TIME:	
COURIER (UPS, SPC T,...)		LAST 5 OF TRACKING NUMBER:	
EST ARRIVAL DATE:		EST. ARRIVAL TIME:	

Method Reference	**7400 PCM**	**AHERA TEM (≤0.005 s/cc AnaSen)**	**CARB-AHERA TEM 0.001 s/cc Ana Sensitivity**
	PLM (asbestos)	**Flame AA (Lead)**	**ICP (Lead)**
Sample Media	☐25 ☐37 mm	☐ 0.45 ☐0.8 micron	☐MCEF ☐Bulk ☐Water ☐Wipe
RESULTS DUE:	3 Days	AM / PM	paint

CHAIN OF CUSTODY DATA:

Sending Info: 6 samples submitted by SH on 6/30 at ____
Received by Lab: 6 samples received by MB on 6/30 at 1015
Received by Analyst: ____ samples received by ____ on ____ at ____

SAMPLE ID	LITERS	Description	Ins/Blanks/Outs
BLUE -1			
OW-2			
OW-3			
OW-4			
WLOER-16			
WLOER-23			
	0 LITERS		BLANK
	0 LITERS		BLANK
	0 LITERS		BLANK

Supplies/Equipment	Qty
Hi-Vol Pumps (3040)	
Lo-Vol Pumps (3020)	
TEM / Pb cassettes (3520)	
PCM cassettes (3500)	
Bulk sampling supply (3710)	6
Lead Wipes (3266)	
Legionella Bottles (3742)	
Water Bottles (Pb/other) (3743)	
Mold Cassettes (3522)	
Smoke Tubes (3540)	
Matched Weight Cassette (3521)	

INSTRUCTIONSTO LAB (delete items not applicable AND circle items applicable):

1. Pickup requested:
   Contact: _____
   Time of Call: _____
2. **Call contact to acknowledge receipt of samples.**
3. **Analyze samples by PCM only.**
4. Analyze inside samples by PCM first; if any sample >0.01 f/cc, contact project manager.
5. **If all samples are <0.01 f/cc, proceed with items 6, 7 or 8, as noted.**
6. Analyze inside samples only; stop if Avg >70 str/mm^2, contact PM before analyzing outsides or blanks.
7. **Analyze all samples, including outside samples and blanks.**
8. **Do NOT analyze outside or blank samples.**
9. **Analyze by TEM only the inside air sample with the highest PCM result.**
10. Serial analysis; stop at first positive (>1%); first trace (<0.1%);except sheetrock and plaster samples.
11. **Analyze all bulk samples, unless otherwise indicated.**
12. **PCB: <0.05mg/kg detection limit required. Authorized to perform cleanup to meet the detection limit.**
13. _____

Report Number: 379476

Invoice Number:

HAZARDOUS MATERIALS ABATEMENT SPECIFICATIONS
HAYWARD UNIFIED SCHOOL DISTRICT
TENNYSON HIGH SCHOOL MODERNIZATION
BUILDINGS A, B, C, D, E, F, G, L, M, N, O, P & S
27035 WHITMAN STREET
HAYWARD, CA 94544

PREPARED FOR:

HAYWARD UNIFIED SCHOOL DISTRICT
24411 AMADOR STREET
HAYWARD, CA 94544

AND

MS. JESSICA LEE
DEPUTY DIRECTOR
TRIGROUP, INC.
1313 NORTH MILPITAS BOULEVARD, SUITE 135
MILPITAS, CA 95035

PREPARED BY:

SCA Environmental, Inc.

3637 GRAND AVENUE, #C
OAKLAND, CA 94610
TEL: (510) 645-6200

SCA PROJECT NO.: B-13490.02

JULY 21, 2022

TABLE OF CONTENTS

Section	Description	Total No. of Pages
00 31 26	Existing Hazardous Material Information	6
02 26 00	Asbestos and Lead Abatement Work Plan	14
02 82 33	Removal and Disposal of Asbestos Containing Materials	25
02 83 33	Removal and Disposal of Materials Containing Lead	20

SECTION 00 31 26

EXISTING HAZARDOUS MATERIAL INFORMATION

TABLE OF CONTENTS

PART 1 - GENERAL 1

1.1 SUMMARY 1
1.2 HAZARD SUMMARY 1
1.3 USE OF DATA 5
1.4 PRE-BID VISIT TO WORK SITE 5

DOCUMENT 00 31 26

EXISTING CONDITIONS: HAZARDOUS MATERIALS

PART 1 - GENERAL

1.1 SUMMARY

A. This Document discloses Reference Documents that are available to the Contractors regarding the hazardous materials investigations and/or past hazardous materials remediation work that was utilized by the District and its Consultant(s) in preparing the Contract Documents.

1. *"Summary Report: Asbestos, Lead & Hazardous Materials Survey, Tennyson High School Modernization, Buildings A, B, C, D, E, F, G, L, M, N, O, P and S, 27035 Whitman Street, Hayward, CA 94544,"* prepared by SCA Environmental, Inc., updated July 21, 2022; SCA Project No. B-13490.02.

1.2 HAZARD SUMMARY

A. Asbestos Hazards: Certain existing building components or materials, which may be impacted by the Work of this Project, are known or presumed to contain asbestos.

1. The following materials were tested and found to contain asbestos at concentrations greater than one percent (>1%):

Building	Material ID	Asbestos-containing Materials Description
A	SINK-6	Stainless steel sink w/black undercoating
C	9FLVCT/M-22	9"x9" Green vinyl floor tile (+) w/black mastic (-)
L	CARMAS-42	Tan carpet glue (+)/black mastic (-) under gray carpets
G	9FLVCT/M-53	9"x9" Tan w/brown streaks vinyl floor tile (+) w/black mastic (-)

(+) = Asbestos, (-) = Non-asbestos

2. No materials were found to contain "trace amounts" (greater than 0.1 percent (>0.1%)) of asbestos.

3. The following suspect materials were assumed to be asbestos-containing. Destructive sampling is required to any renovation or demolition activities:

Building	Material ID	Assumed Asbestos Materials Description
B, G	FL-AAA1	Felt under hardwood floors
C, D, M. O	FIREDOOR-AAA2	Fire-rated core in 20-min fire doors
G	VAPBAR-AAA3	Waterproofing membrane and/or vapor barrier below floor finishes
E	VAPBAR-AAA2	Vapor barriers underneath floor finishes

AAA = Assumed Asbestos-Containing

4. The following suspect asbestos-containing materials were tested or documented and found not to contain asbestos:

Building	Material ID	Non-Asbestos Materials Description
A	12FLVCT/M-1	12"x12" Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound
	WLSH/CLSH-2	Wall and ceiling sheetrock w/tape and join compound

Building	Material ID	Non-Asbestos Materials Description
	BBMAS-3	4”/6” Blue vinyl baseboard w/off-white glue
	FORMICA-4	Various colored formica counter top w/yellow glue
A	SINK-5	Stainless steel sink w/gray undercoating
	FIREDOOR-7	Off-white core in fire doors
	WLPL/CLPL-8	Off-white skimcoat over coarse gray wall and ceiling plaster
B	12FLVCT/M-9	12”x12” Blue w/white specks vinyl floor tile w/yellow glue and off-white leveling compound
	12FLVCT/M-10	12”x12” Off-white w/black streaks vinyl floor tile w/yellow glue over 12FLVCT/M-9
	CARMAS-11	Blue/yellow carpet glue under gray carpets (all over 12FLVCT/M-9)
	WLPL/CLPL-12	Off-white skimcoat over coarse gray wall and ceiling plaster
	BBMAS-13	4” Blue vinyl baseboard w/off-white glue
	CONC-14	Gray concrete sidewalk
C	12FLVCT/M-15	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
	WLPL/CLPL-16	Off-white skimcoat over coarse gray wall and ceiling plaster
	BBMAS-17	4”/6” Blue vinyl baseboard w/off-white glue
	FORMICA-18	Black/gray formica counter top w/yellow glue
	SINK-19	Stainless steel sink w/gray undercoating
	CLGL-20	12”x12” Off-white glued-on ceiling tile w/yellow glue
	WLCER-21	6”x6” Yellow ceramic wall tile w/off-white grout and mortar
	SINK-23	Stainless steel sink w/black undercoating
	SINK-24	Black composite sink
D	12FLVCT/M-25	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
	CARMAS-26	Yellow carpet glue under gray carpets
	WLPL/CLPL-27	Off-white skimcoat over coarse gray wall and ceiling plaster
	BBMAS-28	4”/6” Blue vinyl baseboard w/off-white glue
	CLGL-29	12”x12” Off-white glued-on ceiling tile w/yellow and brown glue
	WLCER-30	6”x6” Yellow ceramic wall tile w/off-white grout and mortar
	FORMICA-31	Various colored formica counter top w/yellow glue
	SINK-32	Stainless steel sink w/gray undercoating
	WLPL/CLPL-33	Off-white textured skimcoat over coarse gray wall and ceiling plaster
L	WLPL/CLPL-34	Off-white skimcoat over coarse gray wall and ceiling plaster
	CLGL-35	12”x12” Off-white nailed-on ceiling tile (some w/brown glue)
M	12FLVCT/M-36	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
	WLPL/CLPL-37	Coarse off-white wall and ceiling plaster
	BBMAS-38	4” Blue vinyl baseboard w/off-white glue
	CLGL-39	12”x12” Off-white glued-on ceiling tile w/brown glue (some glued on walls)
	CONC-40	Gray concrete stage
L	12FLVCT/M-41	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
	BBMAS-43	4” Blue vinyl baseboard w/off-white glue
	CLLI-44	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures
	CLLI-45	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures (replacements)
O	CARMAS-46	Yellow carpet glue under gray carpets
	12FLVCT/M-47	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
	BBMAS-48	4” Blue vinyl baseboard w/off-white glue
G	FLCER-49	2”x1”/2”x2” Green/blue ceramic floor tile w/gray grout and mortar
	WLPL/CLPL-50	Gray textured wall and ceiling plaster
	WLCER-51	4”x4” Yellow/white ceramic wall tile w/off-white grout and gray mortar
	CLTL-52	12”x12” Off-white nailed-on ceiling tile
	BBMAS-54	4” Brown vinyl baseboard w/brown glue
	CLGL-55	12”x12” Off-white glued-on ceiling tile w/brown glue
	CLSP-56	12”x12” Off-white splined ceiling tile w/pinholes and fissures
S	12FLVCT/M-57	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
	PAINT-58	Red/brown paint on concrete floors (some w/residual yellow carpet glue)

Building	Material ID	Non-Asbestos Materials Description
	BBMAS-59	4”/6” Black/blue vinyl baseboard w/off-white glue
	FORMCA-60	Various colored formica counter top w/yellow glue
S	SINK-61	Stainless steel sink w/black undercoating
P	12FLVCT/M-62	12”x12” Blue w/white specks vinyl floor tile w/yellow glue
	BBMAS-63	4” Blue vinyl baseboard w/off-white glue
	CLLI-64	2’x4’ Off-white laid-in ceiling tile w/pinholes and fissures
G	PI-NNN1	Fiberglass insulation on pipes and fittings
S	WL-NNN2	Off-white painted wood wall and/or compressed board wall w/vinyl covering
C	PI-1	Yellow fiberglass insulation with plastic jacket and white silicone on pipe sticking out from slab
F	CLLI-2	2'x4' off-white laid-in ceiling tiles with pin hole
	WL-3	4'x10' beige compressed wall panels with sheetrock base
	WLPL/CLPL-4	Off-white painted wall/ceiling plaster
	CARMAS-5	Blue/clear mastic with off-white leveling compound on concrete underneath blue/tan/red carpet
	FLVCT-6	12"x12" light blue vinyl floor tiles with yellow mastic on concrete
	BBMAS-7	Beige mastic over brown mastic behind 4" blue vinyl baseboard
	WLSH/CLSH-8	Off-white painted wall sheetrock with tape and joint compound (concealed by compressed wall panels (WL-3) at perimeter walls of classrooms, and covered with wall paper in offices)
	CAULK-9	Off-white caulking on equipment, duct and conduit
E	CLGL-10	12"x12" off-white with fissures glued-on ceiling tiles with yellow mastic
	CL-11	12"x12" off-white with pin hole nailed-on ceiling tiles
	CL-12	12"x12" off-white with fissures nailed-on ceiling tiles
	BBMAS-13	Beige/brown mastic behind 4" & 6" blue vinyl baseboard
	FLVCT-14	12"x12" blue vinyl floor tiles with yellow mastic and gray leveling compound on concrete (Corridor West and Middle, E02, E03, E05, E06, E11, E13 and E15)
	FLVCT-15	12"x12" blue vinyl floor tiles with black mastic and gray leveling compound on concrete (Corridor East, E04, E07, E08, E09, E10, E12, E14, E16, E17, E18, E19, E20, E21 and E22)
	WLCER-16	4"x4" off-white/gray ceramic wall tiles with tan glue and gray grout
	FLCER-17	2"x2" gray ceramic floor tiles with gray grout and mortar
	CLGL-18	2'x4' off-white glued-on/nailed-on ceiling tiles with 12"x12" square pattern
	WLSH-19	Wall sheetrock with tape and joint compound
	WLPL/CLPL-20	Off-white painted wall/ceiling plaster with skimcoat
	WLPL/CLPL-21	Off-white painted coarse wall/ceiling plaster on sheetrock base
	CAULK-22	Gray caulking around exterior window frames and louver
	WLCER-23	6"x6" yellow ceramic wall tiles with white grout

NNN = Non-Asbestos

B. Lead Hazards: Certain existing painted or coated surfaces to be impacted by the Work of this Project are known or suspected to contain lead.

1. The following paints, coatings, or materials were tested and found to contain lead at concentrations above the U.S. Department of Housing and Urban Development (HUD) definition of a lead-containing material, established as greater than or equal to one milligram per square centimeter ($\geq$1.0 mg/cm^2) or greater than or equal to one-half percent lead by weight ($\geq$0.5%) or greater than or equal to five thousand parts per million ($\geq$5000 ppm).

Building G:

- Blue paint on structural steel in gym [SCA Sample I.D. BL-7 with 55,000 ppm (5.5%)].

Building F:

- Off-white paint on door frame [SCA Sample I.D. OW-2 with 35,000 ppm].

2. All other paints, coatings or materials tested were found to contain lead at concentrations below the U.S. Department of Housing and Urban Development (HUD) definition of a lead-containing material, established as greater than or equal to one milligram per square centimeter (<1.0 mg/cm^2) or greater than or equal to one-half percent lead by weight (<0.5%) or greater than or equal to five thousand parts per million (<5000 ppm). For OSHA compliance, therefore, the Contractor shall assume that, at a minimum, some lead is "present" in all these materials and that they have the potential, until proven otherwise, to create a lead hazard.

3. The following materials were not all tested but, the Contractor, for the purposes of this Contract and for Cal/OSHA (8 CCR 1532.1) and Cal/EPA (Title 22 CCR) compliance shall assume and manage them as lead containing.

   a. Plumbing components, such as pipes, fittings and solders.

   b. Roof flashings.

   c. Caulking.

   d. Mastic and adhesives.

4. Demolition shall be completed using dust controls and personal protective measures in compliance with the Cal/OSHA Construction Lead Standard, 8 CCR 1532.1.

C. Other Hazards:

1. Biological Hazards requiring compliance with Cal/OSHA's Bloodborne Pathogen standards, include, but are not necessarily limited to:

   a. Sewage, Sludge, and Bacterial Hazards from Untreated Sewage from leaking sewer lines or wastewater treatment facilities.

   b. Pigeon or animal waste.

   c. Disposal requirements for lead are illustrated below:

	TTLC	STLC						
	1000	5						
Condition	Total Pb (mg/kg)	WET Pb (mg/L)	TCLP Pb (mg/L)	non-haz waste	CalHaz (nonRCRA)	Fed Haz (RCRA)	Stabilization Required	Landfill Class
1a	<50 (a1)	NA		Yes	no	no	no	III
1b	<100 (a2)		NA	Yes	no	no	no	III
2a	50 to <1000	<5	<5	Yes (c)	no	no	no	III or II (d)
2b		>5	<5	no	Yes	no	no	I
2c		>5	>5	no	Yes	Yes	Yes	I
2d (b)		<5	>5	no	no	Yes	Yes	I
3a	>1000	<5	<5	No	Yes	No	no	I
3b		>5	<5	no	Yes	no	no	I
3c		>5	>5	no	Yes	Yes	Yes	I
3d (b)		<5	>5	no	no	Yes	Yes	I
4	any	any	>5	no	no	Yes	Yes	I

(a1) 50 = 10 x 5 (STLC for Pb). Per WET method, impossible to exceed STLC even if 100% soluble.
(a2) 100 = 20 x 5 (STLC for Pb). Per TCLP method, impossible to exceed STLC even if 100% soluble.
(b) Physically impossible due to the stronger acid used in WET than TCLP.
(c) Landfills will likely require documentation that TCLP is <5, even though TCLP is almost always less than WET.
(d) Landfill dependent, function of permit, landfill liner, or landfill policy

1.3 USE OF DATA

A. Environmental consultation was obtained only for the use of the District and its Consultants for planning and design stages of this Project. The above mentioned report(s) are not, as a whole, part of the Contract Documents, but the survey data contained therein can be relied upon by the Contractor to characterize general site conditions, although quantities, friability and other factors may have changed or been altered since the published report date(s).

B. All statements, findings, and interpretations in the above mentioned report(s) are those of the Survey or Abatement Consultant(s). The District makes no representations, either expressed or implied, as to the completeness or adequacy of the above-mentioned reports. Contractors are advised that the limited testing of components allow for generalizations in describing the extent of hazardous materials. Specific components or materials, should be checked against the referenced survey report(s) and the Contract Documents, or be tested at affected locations, prior to disturbance of such components or materials.

C. Contractors shall visit the work site and acquaint themselves with its existing conditions. Difference in conditions, if any, shall be brought to the District's attention prior to bidding.

1.4 PRE-BID VISIT TO WORK SITE

A. Prior to bidding, Contractors may make their own investigations to satisfy themselves as to the Site and subsurface conditions, but such investigations shall be performed only under the provisions [of Article "Pre-bid Conference and Site Access" of the Instructions to Bidders (Document 00100)] [set by the District during the Bid Walk Phase].

END OF DOCUMENT 00 31 26

SECTION 02 26 00

ASBESTOS AND LEAD ABATEMENT WORK PLAN

TABLE OF CONTENTS

PART 1 - GENERAL 1
1.1 SUMMARY OF WORK 1
1.2 SUBMITTALS 1
1.3 SCHEDULE 2
1.4 CONTACTS: 2
1.5 SECURITY 3
1.6. SPECIAL CONDITIONS 3
1.7 SUMMARY OF SAMPLING RESULTS: 4
PART 2 - PRODUCTS (MATERIALS AND EQUIPMENT) 5
PART 3 - EXECUTION 5
3.1 STANDARD PROCEDURES 5
3.2 CONTROLLED RENOVATION PROCEDURES 8
3.3 LEAD HAZARD PROCEDURES 11
3.4 MONITORING AND REOCCUPANCY TESTING 13
3.5 DIAGRAMS 13

SECTION 02 26 00

ASBESTOS AND LEAD ABATEMENT WORK PLAN

PART 1 - GENERAL

1.1 SUMMARY OF WORK

The work covered by this work plan includes the removal, handling and disposal of various hazardous materials in accordance with applicable federal, state and local regulations at the designated site.

A copy of this Abatement Work Plan is to be posted on-site during the abatement work.

The Abatement Summary of Work includes the following (as designated):

X	Removal and disposal of asbestos-containing materials (ACM) as part of the District's Modernization for Tennyson High School, 27035 Whitman Street, Hayward, CA.
X	Scraping and stabilization of loose and peeling paints and associated dust controls and personal protective procedures in compliance with Cal/OSHA's Construction Lead Standard, 8 CCR 1532.1, CDPH regulation 17 CCR Sections 35001 through 36100 and the EPA's RR&P rules, as applicable, for renovation, demolition and/or repairs to painted substrates.
X	Preparation and disposal of wastes for repainting, including dust controls and personal protective procedures for manual scraping or sanding and other "trigger 1" work activities in compliance with Cal/OSHA's Construction Lead Standard, 8 CCR 1532.1, CDPH regulation 17 CCR Sections 35001 through 36100 and the EPA's RR&P rules, as applicable.
X	Removal and disposal of PCB-containing ballasts, as designated for lighting replacements.
X	Removal and recycling of mercury-containing lamps and/or mercury-containing thermostats throughout, as designated.
X	For Controlled Renovation Projects: Use of controlled renovation procedures for drilling, coring and anchoring through asbestos-containing materials in accordance with 8 CCR 1529.
X	For Controlled Renovation Projects: Use of dust controls during drilling, coring and anchoring through materials with lead-based paints (LBPs) or lead-containing paints (LCPs) as required per 8 CCR 1532.1.
X	For Controlled Renovation Projects: Clean-up of building dust and contamination for reoccupancy dust sampling.

1.2 SUBMITTALS

Pre-job Submittals (as designated):

X	BAAQMD Notification (10 working days in advance).
X	Cal/OSHA Asbestos Abatement Notification per 8 CCR 1529 (twenty four (24) hours in advance).
X	Cal/OSHA Lead Hazard Notification per 8 CCR 1532.1 (twenty four (24) hours in advance).
X	Notification and distribution of EPA's "Renovate Right" pamphlet per EPA's RR&P rules.
X	Copy of current Contractors' State Licensing Board (CSLB) License, including C-22 License for Asbestos Abatement.
X	Copy of Cal/OSHA Asbestos Registration Certificate.
X	Proof of all required permits or variances.
X	Abatement work schedule.

X	Abatement work plan(s).
X	Copies of workers' and supervisor's asbestos initial training certificates or 8-hr. annual refresher training certificate.
X	Copies of CDPH Certified Lead Worker's and Supervisor's training certificates, applicable for loose and peeling paint work throughout;
X	Copies of workers' annual lead awareness training certificates for general demolition work.
X	Copies of workers' annual medical exam and respirator approval.
X	Copies of workers' twelve (12) month respirator fit testing records.
X	Copies of workers' blood lead test within past ninety (90) days.
X	Safety Data Sheets (SDS) for chemicals used.
X	Emergency phone and email listing.
X	Independent third-party DOP testing of negative pressure units and vacuums.
X	Proposed location of locked dumpster.
X	Rotameter calibrations within past six (6) months.

Periodic Submittals (as designated):

X	Personal air monitoring (daily).
X	Updated worker documentation (as needed).
X	Boundary access logs (daily).
X	Negative pressure records (daily).
X	Copies of updated notification to regulatory agencies (as needed).

Project Close-out Submittals (as designated within two (2) weeks of completion):

X	Certificate of Completion.
X	Receipt and weight tickets from landfill operator or recycler (as applicable).
X	Copies of completed uniform waste manifests, including hazardous and non-hazardous waste.
X	Waste profiling data (TCLP, WET and SW846, as applicable).
X	Filter change logs for all filtration units, water filtration units (as applicable) and respirators.
X	Foreman's daily job reports.
X	Employee and visitor entry/exit logs for all containments.
X	Manometer printouts for all applicable containments.
X	Air sample results for all personnel, work areas and air filtration units.
X	Listing of quantity and locations of all ACM remaining within the Abatement Work Area within 10 days of completion of work per 8 CCR 1529 §k3c

1.3 SCHEDULE

Start Date:	To be determined
End Date:	To be determined
Maximum Abatement Shifts:	To be determined
Time frame:	To be determined

1.4 CONTACTS:

Contact	***Individual***	***Phone #***	***FAX #***	***E-Mail***
TriGroup's Project Manager:	Jessica Lee	(408) 334-3017		jessica@trigroup.us
SCA Environmental, Inc.'s Project Manager	Dan Leung	(415) 867-9544	(415) 962-0736	dleung@sca-enviro.com

Note: Contact the District's Project Manager only in an emergency.

1.5 SECURITY

Arrange site security with the District at the beginning of the job.

Provide temporary security at building penetrations created by the demolition and abatement.

1.6. SPECIAL CONDITIONS

Design:

1. Asbestos Abatement and Lead Hazard Abatement Project Designs shall be completed by the District's designated Environmental Consultant only. Designers shall be EPA-accredited Asbestos Project Designers or California Department of Public Health's Certified Lead Project Designers only.

Air Sampling:

1. PCM Analysis: Analysis of PCM samples shall follow the procedures outlined in NIOSH method 7400 and within these Contract Documents.

2. TEM Analysis: The U. S. Environmental Protection Agency passed regulations for schools under the Asbestos Hazard Emergency Response Act (AHERA), which are found in 40 CFR Part 763 "Asbestos Containing Materials in Schools". This regulation states that all abatement work shall be evaluated upon completion by collecting air samples using aggressive sampling techniques and that all such samples shall be analyzed using Transmission Electron Microscopy (TEM). The TEM protocol for large projects/zones calls for the collection of a minimum of five (5) inside samples, five (5) outside samples, and three (3) blank samples and each should be analyzed by TEM. The regulation strictly defines the criteria that must be met to determine that a building is acceptably clean after removal. TEM analysis turnaround times shall be 24 hours, unless otherwise indicated.

3. The sampling and analytical criteria in the AHERA regulation for schools shall be viewed as the preferred method for determining that any asbestos abatement project in any building has achieved a satisfactory level of cleanliness. The District shall clear all work areas using aggressive sampling and TEM analysis, unless otherwise noted below. The District reserves the right to determine the quantity of reoccupancy air samples and blanks to be collected for each subzone.

4. The District shall pay the Environmental Consultant's costs of the final round of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that will meet the asbestos abatement specification. All rounds of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that fail to meet the contract criteria shall be borne by the Contractor. For the purpose of this paragraph, visual inspection includes the area isolation inspection, pre-encapsulation inspection, and final area clean-up inspection.

5. During all asbestos-related work, perimeter sample results will be collected by the District and/or their Environmental Consultant (Industrial Hygienist). These samples will be analyzed by Phase Contrast Microscopy (PCM). Sample results that are in excess of the background level or one hundredth fibers per cubic centimeter (>0.01 f/cc) Project Action Level may be forwarded for analysis by Transmission Electron Microscopy (TEM) with a twelve (12) hour turnaround specified. Handling, shipping, and analysis charges (including the Environmental Consultants time and expenses) will be paid for by the Contractor. Any sample results in excess of seventy asbestos structures per square millimeter (70 str/mm^2) of filter area (corrected for a twelve hundred to eighteen hundred (1,200 - 1,800) liter sample volume as appropriate) will require cleaning, inspection, and resampling of the affected area at the Contractor's expense.

6. During all lead hazard-related work, such as demolition, torching and welding activities, etc., as applicable, perimeter air sample and/or lead wipe sample results will be collected by the District's Environmental Consultant (Industrial Hygienist). These samples will be analyzed by flame atomic absorption. Wipe sample results which are in excess of the construction dust control standard of four hundred micrograms per square foot (>400 µg/SF) for adjoining construction zones on two (2) consecutive samplings (or two (2) consecutive days) or forty 10 micrograms per square foot (>10 µg/SF) for adjoining occupied (floor) areas on any occasion will require isolation and clean-up of the affected areas. Air sampling results in excess of the Cal/OSHA "Project Action Level" of thirty micrograms per cubic meter (>30 µg/m^3) will require isolation of the work area and amendment of work procedures and/or clean-up of the affected areas. Resampling of the affected areas and handling, shipping, and analysis charges (including the Environmental Consultant's time and expenses) for additional sampling required to show background levels below these construction lead standards shall be borne by the Contractor.

Submittals:

1. All pre-construction submittals shall be forwarded to the District's Project Manager and the District's designated Environmental Consultant (Industrial Hygienist) in the Contract Documents and herein.

2. Failure by the Contractor to fulfill the submittal requirements as specified in the Contract Documents and herein shall be the basis for withholding final payment until such submittal requirements are satisfied.

Additional Liquidated Damages:

1. The Contractor shall pay for all Environmental Consultant costs for delays in completion of work beyond the authorized schedule established by the District. Such charges shall include Consultant's observations and inspections, daily air monitoring, equipment, transportation and analysis charges. Such costs are estimated at $1,500 per day, exclusive of any costs associated with final reoccupancy air testing. See the Liquidated Damages Section in the General Conditions for further requirements.

Waste Manifests:

1. The Contractor shall coordinate the inspection and signing of all waste manifests with the District and its Environmental Consultant, while on-site. Failure to complete the manifests or callbacks after completion of the project will be backcharged to the Contractor.

1.7 SUMMARY OF SAMPLING RESULTS:

Asbestos-containing materials identified include:

- See Section 00 31 26 or the Contract Documents, as applicable. OR
- For a list of ACM and ACBM / ACCM, refer to the Materials Matrix Reports attached to Section 02 26 00: Hazardous Materials Existing Conditions. Additional suspect materials identified should be assumed asbestos-containing until such time as sampling can be performed to verify asbestos content.

Non-asbestos materials identified, which may be impacted by the renovations include:

- See Section 00 31 26 or the Contract Documents, as applicable.

Lead-containing paints tested on-site, requiring protection from disturbances causing airborne lead dusts during the abatement phase include:

- See Section 00 31 26 or the Contract Documents, as applicable; or

Treat all similar paints and substrates in kind. Note that most building paints contain some lead content, and require demolition dust control procedures for compliance with Cal/OSHA's Construction Lead Standard under 8 CCR 1532.1.

Scrape and stabilize all loose and peeling paints on-site and characterize for possible disposal as hazardous waste. Intact painted elements may be disposed as non-hazardous waste complying with dust controls and personal protective procedures per Cal/OSHA regulation 8 CCR 1532.1 and CDPH regulation 17 CCR Sections 35001 through 36100.

PART 2 - PRODUCTS (MATERIALS AND EQUIPMENT)

NOT USED

PART 3 - EXECUTION

3.1 STANDARD PROCEDURES

Asbestos Abatement:

Abatement Material Group A-1	Vinyl Floor Tiles with Related Mastics (As Applicable)			
Method:	X Full Isolation or Mini-Containment	___ Glovebag	___ Glovebag-Cutout	
Material	***Activity Class***	***Sample I.D.***	***% Asbestos***	***Est. Quantity***
Vinyl floor tiles with related mastics	2	9FLVCT/M-22 12FLVCT/M-53	8-10% CH 8% CH	Verify in Field
Carpet glue with black mastics	2	CARMAS-42	3-6% CH	Verify in Field

Asbestos Abatement Procedures for Material Group A-1 (Applicable Indicated):

Decon System:	X Shower if ≥250 SF	___ Central	X Hudson sprayer or bucket decon if <250 SF
Floor:	___ # Layers Poly	___ Drop Cloths	___ Scaffold
Walls:	1 # of Polyethylene Layers	X 6-ft. high Splash Guards	
Criticals:	2 # of Polyethylene Layers	__ Plywood Barriers	

Other Comments: **Carpeting & Mastics (as Applicable):** Remove glued-down carpeting in areas with noted asbestos-containing tiles and/or mastics following set-up of the abatement zone and establishing negative pressurization. Remove the carpet and burrito wrap for disposal as non-hazardous waste.

For Vinyl Floor Tiles & Mastic Abatement: Abate the vinyl floor tiles and mastics and baseboard mastics, as applicable, using full isolation or mini-containment abatement methods per Cal/OSHA 8 CCR 1529 Work Class II procedures, minimum, with negative pressurization of all zone(s). [Demolish interior partitions and counters to access and abate concealed materials as noted on the Demolition Plans.] Remove the mastics using an approved "low odor" mastic remover with greater than 140°F flash point. Dispose of tile waste as Category 1 non-friable waste. Characterize and dispose of rags and solvent residues as a separate hazardous waste stream.

When a mechanical buffer is utilized for tile removal, set-up a full isolation containment with shower decontamination system and notify BAAQMD 10 working days in advance of such work. Dispose of mastics and rags as friable asbestos waste, minimally.

For Disposal & Cleanup: Burrito wrap carpeting with residual mastics in 2 layers of 6-mil polyethylene sheeting and dispose as Category 1 non-friable waste.

Double gooseneck bag all asbestos floor tiles as dispose as Category 1 non-friable waste. Dispose of mastics, rags and associated waste as specified by the mastic remover manufacturer, potentially as hazardous waste. HEPA vacuum the surrounding area, prior to visual inspection by the Environmental Consultant.

If a mobile containment is used, clean-up and reseal the phone booth-type containment and airlock entry between uses.

See Procedure CR-3 below for further details on “minor” procedures for coring, anchoring, etc.

Abatement Material Group A-3:	Misc. Interior Finishes (As Applicable)			
Method:	X Full Isolation or Mini-Containments	___ Glovebag	___ Glovebag-Cutout	
Material	***Activity Class***	***Sample I.D.***	***% Asbestos***	***Est. Quantity***
Sink undercoating	2	SINK-6	8% CH	Verify in Field
Fire doors	2	FIREDOOR-AAA2	Assumed >1%	Verify in Field
Waterproofing membrane	2	VAPBAR-AAA3 VAPBAR-AAA2	Assumed >1%	Verify in Field

Asbestos Abatement Procedures for Material Group A-3 (Applicable Indicated):

Decon System:	___ Shower	___ Central	X Hudson sprayer or bucket decon
Floor:	1 # Layers Poly	___ Drop Cloths	___ Scaffold
Walls:	1 # of Polyethylene Layers	X Splash Guards	
Criticals:	1 # of Polyethylene Layers	__ Plywood Barriers	

Other Comments: **For Sink Undercoating:** Remove sink intact, burrito-wrap in two (2) layers of six (6) mil fire-retardant polyethylene sheeting, and dispose as friable asbestos waste.

For Fire Doors: Remove fire doors with 45-minute or greater fire rating intact, burrito-wrap in two (2) layers of six (6) mil fire-retardant polyethylene sheeting, and dispose as friable asbestos waste.

For waterproofing membrane: Remove non-asbestos flooring and waterproofing membrane using full isolation procedures, satisfying the requirements of CalOSHA 8 CCR 1529 Work Class II procedures. Use wet methods for dust controls. Dispose of materials as non-friable asbestos waste.

See Procedures CR-2 below for further details on "minor" procedures for coring, anchoring, etc.

Abatement Material Group A-5	Felt under hardwood flooring			
Method:	X Full Isolation or Mini-Containment	___ Glovebag	___ Glovebag-Cutout	
Material	***Activity Class***	***Sample I.D.***	***% Asbestos***	***Est. Quantity***
Felt under Hardwood Flooring	2	FL-AAA1	Assumed >1%	Verify in Field

Asbestos Abatement Procedures for Material Group A-5 (Applicable Indicated):

Decon System:	X Shower if >25 SF	___ Central	X Hudson sprayer or bucket decon if <25 SF
Floor:	1 # Layers Poly	___ Drop Cloths	___ Scaffold
Walls:	1 # of Polyethylene Layers	X Splash Guards	
Criticals:	2 # of Polyethylene Layers	__ Plywood Barriers	

Other Comments: **For Felt under Hardwood Flooring:** Remove the hardwood flooring and abate the felt using full isolation or mini-containment abatement methods per Cal/OSHA 8 CCR 1529 Work Class 2 procedures, minimum, with negative pressurization of the zone(s). Demolish interior partitions and counters to access and abate concealed materials. using wet methods and dispose of as friable asbestos waste.

All loose and abated materials must be locked within the waste dumpster daily before leaving the site. HEPA vacuum the contained area for final clearances.

If a mobile containment is used, clean-up and reseal the phone booth-type containment and airlock entry between uses.

See Procedures CR-3 below for further details on "minor" procedures for coring, anchoring, etc.

3.2 CONTROLLED RENOVATION PROCEDURES

Controlled renovation procedures identified herein cover minor procedures and disturbances to ACM or 'trace' asbestos substrates generally under 2-inch diameter cores or less than 100 SF total per project. Controlled renovation procedures through friable surfacing materials, such as acoustical plasters or sprayed-on fireproofing, shall be completed by personnel with 16-hrs. initial asbestos O&M training and annual 8-hr. refresher training. Wetted sponge procedures through 'trace' asbestos substrates or miscellaneous materials can generally be completed by personnel with 2-hrs. annual asbestos awareness training per 8 CCR 1529.

Controlled Renovation Procedures:

Controlled Renovation Activity CR-2:	Controlled Renovations through Exterior Building Paper or Waterproofing Membrane (As Applicable)			
Method:	X Cordon Area	___ Glovebag	___ Glovebag-Cutout	
Material	***Activity Class***	***Sample I.D***	***% Asbestos***	***Est. Quantity***
Waterproofing membrane	2	VAPBAR-AAA	Assumed >1%	Verify in Field

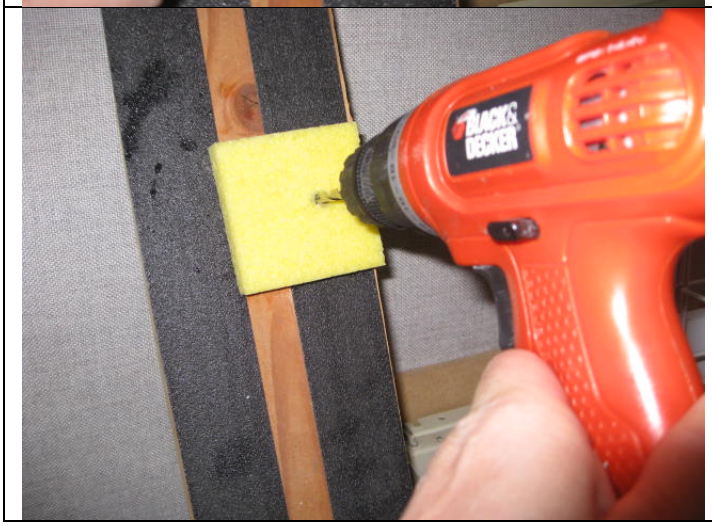
Controlled Renovation Procedures for CR-2 (Applicable Indicated):

Decon System:	___ Shower	___ Central	X Hudson sprayer or bucket decon
Floor:	___ # Layers Poly	X Drop Cloths	___ Scaffold
Walls:	___ # of Polyethylene Layers	__ Splash Guards	
Criticals:	___ # of Polyethylene Layers	__ Plywood Barriers	

Other Comments: Shoot or drill anchors through a wetted sponge, where feasible, following installation of polyethylene drop cloths on the floor or other surfaces. Cordon off the room or area and cut holes for receptacle or other devices using drop cloths on the ground and wet methods. Remove the sheetrock avoiding the joint compounds, where feasible. Continually wet the controlled renovation area during the process and wet wipe and HEPA vacuum the area immediately following completion of the controlled renovation procedures. Dispose of the sheetrock and joint compounds as "trace" (<1%) composite waste.

Minor procedures impacting asbestos-containing sheetrock and non-acoustical plaster finishes, such as installation of raceway and wiremold anchors, etc., may be completed using drop cloths and wet sponges for drilling or shooting anchors. All debris shall be immediately wet wiped or HEPA vacuumed to avoid dispersion of asbestos fibers.

The following photos show the typical wetted sponge procedures to be utilized on non-friable and painted substrates.

	Lightly dampen sponge with clean water.
	Position sponge over location to be drilled.
	Drill hole through the sponge, which will capture debris.

	After drilling, lightly wipe the hole with the wetted sponge.
	Place dirty sponge in plastic bag and dispose as non-hazardous waste.

Controlled Renovation Activity CR-3:	Controlled Renovations through Vinyl Flooring with Related Mastics & Vinyl Sheeting (As Applicable)			
Method:	X Cordon Area	___ Glovebag	___ Glovebag-Cutout	
Material	***Activity Class***	***Sample I.D***	***% Asbestos***	***Est. Quantity***
Vinyl floor tiles with related mastics	2	9FLVCT/M-22 12FLVCT/M-53	8-10% CH 8% CH	Verify in Field
Carpet glue with black mastics	2	CARMAS-42	3-6% CH	Verify in Field
Felt under hardwood flooring	2	FL-AAA1	Assumed >1%	Verify in Field

Controlled Renovation Procedures for CR-3 (Applicable Indicated):

Decon System:	___ Shower	___ Central	X___ Hudson sprayer or bucket decon
Floor:	___ # Layers Poly	X___ Drop Cloths	___ Scaffold
Walls:	___ # of Polyethylene Layers	X Splash Guards	
Criticals:	___ # of Polyethylene Layers	__ Plywood Barriers	

Other Comments: **For Vinyl Asbestos Floor Tiles (VAT):** Cordon off the room or area and remove the impacted floor tiles before drilling through the substrate. Where feasible, use water to dislodge the tile. Where tile removal is not feasible or fracturing of the tiles will occur, saturate the tile with shave cream and core through the tiles. Frequently wipe up all chips and debris and dispose as Category 1 non-friable waste. Wet wipe with a clean sponge and HEPA vacuum the area upon completion of coring. Do not let cores with intact ACM debris to fall into the ceiling plenum or Crawl Space below.

For Flooring Mastics: Cordon off the room or area and remove the mastic using a mastic remover with a flash point greater than 140 deg. F. Dispose of the mastic and rags as Category 1 non-friable waste. Wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures.

For Felt under Hardwood Flooring: Cordon off the room or area and remove the impacted hardwood flooring and felt before drilling through the substrate. Where hardwood flooring removal is not feasible, saturate the flooring with shave cream and core through. Frequently wipe up all chips and debris and dispose as Category 1 non-friable waste. Wet wipe with a clean sponge and HEPA vacuum the area upon completion of coring. Do not let cores with intact ACM debris to fall into the ceiling plenum or Crawl Space below.

Clean-up debris immediately.

3.3 LEAD HAZARD PROCEDURES

Lead Hazards Construction Work:

Zone(s) L-1:	Paint Stabilization, Painted Substrate Demolition and Dust Clean-up			
Sample I.D.	***Color***	***Area***	***Lead Content***	***Activity Class***
HUD-defined Lead-Based Paints or Glazing	Varies	See Section 00 31 26	≥5,000 ppm or ≥0.5% or ≥1 mg/cm^2	1
Majority of painted substrates	Varies	See Section 00 31 26	>600 ppm	1

Lead Hazard Procedures for Zone(s) #L-1 (Applicable Indicated):

Decon System:	___ Shower	___ Central	X Hudson sprayer or bucket
Required Methods:	___ Full Containment	X Manual Methods w/Drop Cloths	X Loose & Peeling Paints Stabilization

Other Comments: **For Stabilization of Loose & Peeling Paints:** Post notices, including CDPH, Cal/OSHA and EPA RR&P notices, as applicable, prior to start of work. Manually scrape and stabilize loose and peeling paints prior to demolition of painted substrates using drop cloths, wet methods, and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.11 and the EPA's RR&P rules. Avoid dry sweeping. Burning of paints, use of heat guns greater than 1,100 deg. F, and use of leaf blowers or compressed air for clean-up are prohibited. Use of mechanical equipment, such as sanders, grinders and needle guns without a HEPA-vacuum attached thereto are prohibited for sites with children under the age of 6 as occupants (per EPA's RR&P rules). Work areas shall be cleaned-up of lead hazards daily before leaving the site. **Note that all toilets with lead concentrations over 1.0 mg/cm2 in the ceramic tile glazing must be abated by CDPH Certified Lead Workers and Supervisors. General demolition work of painted substrates can be completed by workers with annual lead awareness training per 8 CCR 1532.1.**

For Mechanical Sanding: Work areas requiring mechanical sanding or stripping of painted surfaces with any lead content shall be fully contained with polyethylene dust barriers, establishing negative pressure of the zone, and using HEPA-filtered tools and other dust control procedures as outlined under 8 CCR 1532.1.

For Disposal & Cleanup: Demolish and dispose of intact painted substrates as non-hazardous waste. Characterize and dispose of loose and peeling paint debris, chemical strippers, rags, etc. as potential hazardous waste. Clean-up drop cloths and HEPA vacuum loose and peeling chips and debris daily for all work areas before leaving the site.

Complete abatement work exceeding the permissible exposure limit using CDPH Certified Lead Workers and Supervisors, including but not necessarily limited to demolition of lead glazed ceramic tiles, extensive manual or mechanical scraping or sanding of loose and peeling paints, demolition of concrete-encased primed steel, and spot abatement of primed structural steel prior to torching or cutting, as applicable.

Other Items:

PCB Ballasts:	X	Remove and dispose of PCB ballasts throughout the buildings as required by the renovation and demolition plans. Any ballast not otherwise labeled by the manufacturer as non-PCB is considered as PCB containing. Quantity— field verify quantity.
Mercury Lamp Recycling	X	Remove and recycle fluorescent lamps throughout the buildings as required by the renovation and demolition plans. Quantity— field verify quantity.

3.4 MONITORING AND REOCCUPANCY TESTING

Asbestos Reoccupancy Requirements (includes budgeted # of samples):

VAT and Mastic Abatement	___ Visual Only	___ PCM/zone	5 TEM/zone
Flooring Felt Abatement	___ Visual Only	___ PCM/zone	5 TEM/zone
Waterproofing and Membrane Abatement	X Visual Only	___ PCM/zone	___ TEM/zone
Controlled Renovation Method CR-2 – Misc. Wall or Ceiling Materials	X Visual Only	___ PCM/zone	___ TEM/zone
Controlled Renovation Method CR-3 – Vinyl Flooring with Related Mastics	X Visual Only	___ PCM/zone	___ TEM/zone

Lead Reoccupancy Requirements (includes budgeted # of samples):

Interior Zones	X Post Abatement Visual Only	___ Post Construction Wipe Testing Floors	___ Post-Construction Wipe Testing Window Sills
Exterior Zones	X Post Abatement Visual Only	___ Post Construction Wipe Testing Floors	___ Post-Construction Wipe Testing Window Sills

3.5 DIAGRAMS

See the Architectural, Mechanical, Plumbing and Electrical Plans for areas of renovation.

Consultant's Signature:	Dan Leung, CIH, CSP, CAC #07-4175, CDPH #7329 	**Date:**	7/21/22
Contractor's Signature		**Date:**	

SECTION 02 82 33

REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

TABLE OF CONTENTS

PART 1 – GENERAL....1

1.1 SUMMARY....1
1.2 REFERENCES....1
1.3 DEFINITIONS....2
1.4 SUBMITTALS....10
1.5 QUALITY ASSURANCE....11
1.6 TIME LIMITATION AND DELAY CHARGES....12

PART 2 – PRODUCTS....12

2.1 ASBESTOS WORK - MATERIALS AND EQUIPMENT....12

PART 3 – EXECUTION....15

3.1 EXAMINATION....15
3.2 PREPARATION....15
3.3 ASBESTOS ABATEMENT PROCEDURES (AS APPLICABLE)....17
3.4 WASTE DISPOSAL AND MANIFESTING....24

SECTION 02 82 33

HAZARDOUS MATERIALS ABATEMENT AND CONTROL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Minimum requirements for hazardous materials handling, control, and abatement activities, as applicable, including, but not necessarily limited to:

1. Hazardous materials controls.
2. Handling and disposal of asbestos-containing building materials (ACBM).
3. Demolition associated with access to hazardous materials.
4. Criteria for reoccupancy testing.

B. Related Documents:

1. Document 00 31 26 - Existing Hazardous Material Information

C. Related Sections:

1. Section 02 26 00 – Asbestos and Lead Abatement Work Plan
2. Section 01 33 00 - Submittals.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. E84: "Test Method for Surface Burning Characteristics of Building Materials."
2. E119: “Standard Method for Fire Tests of Building Construction and Materials.”
3. E849: Safety and Health Requirements Relating to Occupational Exposure to Asbestos.”

B. American National Standards Institute (ANSI):

1. Z9.2: “Fundamentals Governing the Design and Operation of Local Exhaust Systems.”
2. Z41.1: “Men’s Safety Toe Footwear.”
3. Z86.1: “Commodity Specification for Air.”
4. Z87.1: “Practice for Occupational and Educational Eye and Face Protection.”
5. Z88.2: “Practices for Respiratory Protection.”
6. Z88.6: “Respiratory Protection - Respiratory Use Physical Qualifications for Personnel.”

7. Z89.1: “Requirements for Industrial Head Protection.”

C. National Fire Protection Association (NFPA):

1. Standard 10: “Fire Extinguishers.”

2. Standard 70: “National Electric Code.”

3. Standard 90A: “Fire Rating of Sprayed-On Fireproofing.”

4. Standard 701: "Small Scale Fire Test for Flame Resistant Textiles and Films."

D. California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA):

1. Title 8 California Code of Regulations (8 CCR) Section 5144 - Respiratory Protection.

2. Title 8 California Code of Regulations (8 CCR) Section 1532.1 - Construction Lead Standard.

3. Title 8 California Code of Regulations (8 CCR), Article 4, Section 1529 - Asbestos Standard for the Construction Industry.

4. Title 8 California Code of Regulations (8 CCR) Sections 3203 and 1509 - Injury and Illness Prevention Program.

5. Title 8 California Code of Regulations (8 CCR), Article 110, Section 5208 - Asbestos Standard for General Industry.

6. Title 8 California Code of Regulations (8 CCR), Article 2.5, Section 341.6 for employer registration when disturbing more than one hundred square feet (100 SF) of ACCM.

E. U. S. Department of Housing and Urban Development (HUD): Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing,” referred to as the “HUD Guidelines.”

1.3 DEFINITIONS

A. Certain terms used in the Specifications are defined under this Section. These definitions are not necessarily complete or exclusive, but generally apply to the extent that they are not stated otherwise explicitly in other sections of this Specification. The following definitions apply throughout the Contract Documents

1. Abatement - Procedures for control of fiber release from asbestos-containing materials, including encapsulation, enclosure, controlled renovation procedures and removal.

2. Abatement Contractor - Contractor responsible for removal of all ACM and ACBM unless otherwise noted herein.

3. ACBM – AHERA/ASHARA term for Asbestos-Containing Building Material with more than 1% asbestos comprising an interior structural member in or on the building inclusive of covered walkways, porticos and exterior HVAC TSI.

4. ACCM – Asbestos-Containing Construction Material for manufactured construction material with greater than 0.1% asbestos.

5. ACM – Asbestos-Containing Material with more than 1% asbestos

6. Accessible ACM - materials that can be removed safely by the workers and re-insulated adequately by subsequent renovation activities.

7. Aggressive Reoccupancy Sampling- work area reoccupancy testing at the completion of abatement using aggressive sampling techniques, whereby air samples are collected while fans, leaf blowers, or air circulating devices are operated in a work area, and while floors, walls, and other structural surfaces are swept with brooms or a leaf blower to entrain any particles that may be present. Aggressive sampling will be utilized at the completion of interior abatement, unless otherwise noted.

8. AHERA - Asbestos Hazard Emergency Response Act (40 CFR Part 763).

9. Airless Sprayer - airless sprayer with the following minimum features: 120 volt, totally enclosed fan cooled electric motor equipped with a 3-wire cord; gun safety lock to prevent accidental spraying; single pump control knob to adjust priming and pressure from 500 to 2,500 psi at a constant volume; stainless steel or tungsten carbide paint valves; replaceable in-line filter and hose; self-cleaning adjustable spray tip; and 0.25 to 0.50 gpm delivery.

10. Airlock - a system for permitting ingress or egress without permitting air movement between any two adjacent areas consisting of two curtained doorways. The airlock must be maintained in uncontaminated condition at all times.

11. Air Monitoring - the process of measuring the fiber content of a specific volume of air in a stated period of time. Analysis of air samples shall be by phase contrast microscopy in accordance with the NIOSH 7400A or the OSHA Reference Method, or Transmission Electron Microscopy in accordance with 40 CFR Part 763 Asbestos-Containing Materials in Schools as published in the Federal Register, October 30, 1987, as applicable.

12. Amended Water - a water to which a surfactant has been added at a ratio according to the manufacturer's directions with a minimum surface tension of 29 dynes per square centimeter when tested in accordance with ASTM D 1331.

13. Asbestos - a generic name given to a number of naturally occurring hydrated mineral silicates that possess a unique crystalline structure, are incombustible in air, and are separable into fibers. Asbestos includes the asbestiform varieties of chrysotile (serpentine); crocidolite (riebecklite); amosite (cummingtonite-grunerite); anthophyllite; tremolite; and actinolite. For the purposes of determining respiratory protection and worker protection, both the asbestiform and non-asbestiform varieties of the above materials and any of these materials that have been chemically treated or altered shall be considered asbestos.

14. Asbestos Removal/Abatement Operations - all herein specified procedures pertaining to the removing and disposing of all ACM at an EPA approved site, including encapsulation, repair, enclosure, encasement, controlled renovations, and operations and maintenance programs.

15. Asbestos Work Area - a work space within which all exposed surfaces, except those being removed, and fixed equipment have been sealed with intact layer(s) of polyethylene sheeting or equivalent. Work can be performed in this area that may result in the release of asbestos fibers into the work space only.

16. Asbestos Work Class: Activities for removing asbestos materials by categories are as follows:

a. Work Class I: Activity involving removal of TSI and surfacing asbestos-containing materials (ACM) or friable presumed asbestos-containing materials (PACM).

b. Work Class II: Activity involving removal of TSI and surfacing asbestos-containing materials (ACM) or friable presumed asbestos-containing materials (PACM).

c. Work Class III: Repair and maintenance operations where TSI or surfacing is likely to be disturbed, which fits within one standard glovebag or waste container under sixty (60) inches.

d. Work Class IV: Maintenance and custodial activities during which employees contact but do not disturb PACM or ACM and activities to clean-up dust, waste and debris resulting from Work Class I, II, and III activities.

17. Barrier - any surface that separates or seals off the work area to inhibit the movement of asbestos fibers, including:

a. Construction Barrier - a partial barrier installed to restrict access to areas adjacent to the project area; may include barrier tape, where applicable.

b. Physical Barrier - an airtight, solid barrier installed where the work area is adjacent to public areas.

c. Visual Barrier - an opaque barrier constructed of polyethylene sheeting so that abatement operations are not visible to building occupants.

d. Visual Barrier - an opaque barrier constructed of polyethylene sheeting so that abatement operations are not visible to building occupants.

e. Critical Barrier - the physical point at which the pressure differential occurs, defined by a single or multiple barriers. Establish a critical barrier at every point where a distinct, independent air space exists adjacent to the work area, such as at doorways, windows, diffusers, etc. Critical barriers may be constructed of fire-retardant plywood, sheet metal, or sheetrock, as specified. Alternatively, a 6- or 10-mil layer of polyethylene sheeting may suffice, installed with reinforcing studs or furring strips. Critical barriers or other means of isolation are required for Class I Asbestos Work exceeding 25 LF or 10 SF.

f. Primary Barrier - consists of two (2) layers of fire-retardant polyethylene sheeting installed to protect interior surfaces of the work area from damage or encapsulant and aid in the decontamination process. Surfaces covered by primary barriers shall be pre-cleaned and inspected by the Environmental Consultant in order for these barriers to remain during the reoccupancy air sampling phase.

g. Secondary Barrier - consists of a single layer of fire-retardant polyethylene sheeting installed on top of the primary barrier or building surfaces to catch gross debris and aid in the decontamination process.

18. Certified Industrial Hygienist (CIH) - an industrial hygienist certified by the American Board of Industrial Hygiene.

19. CFM - cubic feet per minute.

20. Clean Equipment Room - a room between the holding room and non-work area that is part of the equipment decontamination enclosure system. The clean equipment room comprises an airlock and must be maintained in an uncontaminated condition at all times.

21. Clean Room (Change Room) - an uncontaminated room that is part of the worker decontamination enclosures system, with storage space for workers' street clothes and protective equipment.

22. Competent Person - a person capable of identifying and eliminating asbestos hazards as defined per OSHA Regulation 29 CFR Part 1926.1101 and per DOSH Title 8 CCR Section 1529.

23. Contaminated Area - a work area where airborne concentrations of ACM exceed or can reasonably be expected to exceed the PEL, if disturbed.

24. Contractor - the individual or legal entity awarded the Contract for the asbestos abatement, including its employees, subcontractors, and subcontractors' employees.

25. Curtained Doorway - a device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms. Typically constructed by placing two overlapping layers of polyethylene sheeting over an existing or temporarily framed doorway, securing each along the opposite vertical edge of the doorway. Space the two curtained doorways sufficiently apart to form an airlock, unless otherwise directed or approved due to space limitations. Weigh the curtains with a flexible/conforming material such as steel chain or PVC pipe.

26. Decontamination Enclosure System - a series of connected rooms with curtained doorways between any two adjacent rooms, for the decontamination of workers or of materials and equipment. A decontamination enclosure system contains at least one airlock.

27. Demolition - the destruction or removal of any structural member or architectural treatment/surfaces of the facility together with any related handling operations.

28. Disposal Bag - 6-mil minimum thickness, leak proof plastic bag used for transporting asbestos waste from the work area to the disposal site, with the prescribed warning labels and identification markers.

29. Encapsulant (Sealant) - a liquid material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent release of fibers, including :

    a. Bridging Encapsulant - an encapsulant that forms a discrete layer on the surface of an in-situ asbestos matrix.

    b. Penetrating Encapsulant - an encapsulant that is absorbed by the in-situ asbestos matrix without leaving a discrete surface layer.

30. Encapsulation - all herein specified procedures necessary to coat asbestos-containing material or asbestos-contaminated surfaces with an encapsulant to control the possible release of asbestos fibers into the ambient air.

31. Enclosure - the construction of airtight walls, ceilings, and floors between the asbestos material and the facility environment, or around surfaces coated with asbestos materials, which prevents the release or disturbance of asbestos materials.

32. Environmental Consultant - technical representative of the District, consisting of Cal/OSHA Certified Asbestos Consultant(s) (CACs) and Certified Site Surveillance Technician(s) (CSSTs).

33. EPA - U.S. Environmental Protection Agency.

34. Equipment Decontamination Enclosure System - a decontamination system for materials and equipment consisting of a designated area of the work area for a washroom, holding room and clean equipment room.

35. Equipment Room - a room that is part of the worker decontamination enclosure system, with provisions for storage of potentially contaminated clothing or equipment. Keep the equipment room clear of suspect asbestos-containing debris at all times.

36. Excursion Limit - a level of airborne fibers specified by OSHA as an occupational exposure limit for asbestos set at 1.0 total fibers per cubic centimeter as measured over a 30-minute period.

37. Fibers/cc - fibers per cubic centimeter.

38. Fireproofing - spray or trowel-applied fire resistant material and any overspray thereof.

39. Fixed Object - any object which cannot be removed from the work area. This would include, but is not limited to, furniture, equipment, walls, doors, etc.

40. Friable - a material that can be crumbled, pulverized, or reduced to powder by hand pressure when dry, and includes previously non-friable material that becomes damaged to the extent that, when dry, it may be crumbled, pulverized, or reduced to powder by hand pressure.

41. Full Isolation (FI) Work Area - designated rooms, spaces, or areas of the project that have been totally isolated for removal work by sealing, plasticizing, equipping with decontamination enclosure systems, and placing under negative pressure. Construct the full isolation work area (as a minimum) per OSHA Regulation 29 CFR Part 1926.1101 and DOSH Title 8 CCR, Section 1529.

42. Glove Bag - a manufactured or fabricated assembly consisting of a bag constructed of at least 6-mil transparent plastic, two inward-projecting long sleeve gloves, and may also contain an inward-projecting water wand sleeve, an internal tool pouch, and an attached, labeled receptacle or portion for asbestos waste. Most commonly used for the abatement of TSI.

43. Glove Bag (GB) Work Area - a method for removing ACM from heating, ventilating, and air conditioning (HVAC) ducts, piping runs, valves, joints, elbows, and other non-planar surfaces. The glove bag assembly is constructed and installed in such a manner that it surrounds the object or area to be contaminated and to contain all asbestos fibers released during the abatement process. Provide secondary containment for all glove bag work unless noted otherwise. Proper work procedures include smoke testing, no sliding or reuse, sealing adjacent materials (typically with a lagging compound), and a minimum of two abatement workers.

44. Glove Bag Work Area With Cut-Out (GBCO) - same as GB Work Area except that the pipe section or duct is removed with insulation in place. Two sections of the pipe are cleaned using GB technique after pipe or duct and insulation are wrapped and sealed with polyethylene. Then pipe or duct is cut at both ends and disposed of intact as ACM.

45. Ground Fault Interrupter (GFI) - a device that automatically de-energizes any high voltage system component, which has developed a fault in the ground line.

46. HEPA Filter - a high efficiency particulate air (HEPA) filter which has a tested and documented efficiency for trapping and retaining a minimum of 99.97% of a 0.3 micrometer (aerodynamic diameter) dioctylphthalate (DOP) test aerosol in accordance with ANSI Standard Z9.2 - 1979 "Fundamentals Governing the Design and Operations of Local Exhaust Systems," and Federal Standard 209-B for Class 100 air and as indicated in UL 586.

47. HEPA Vacuum Equipment - vacuuming equipment with a (UL 586 label) HEPA filtration system capable of collecting and retaining asbestos fibers.

48. Holding Room - a room between the washroom and clean equipment room in the equipment decontamination enclosure system. The holding room comprises an airlock, and must be maintained in uncontaminated condition at all times.

49. HVAC System - heating, ventilating and air-conditioning systems consisting of pipes, ducts, and equipment (air-conditioners, chillers, boilers, heaters, pumps, fans, controls, etc.) used to heat, cool, move and/or filter air in a building; also known as mechanical systems.

50. Make-up Air - supplied or re-circulated air to offset that that has been exhausted from an area.

51. Medical Surveillance - a periodic comprehensive review of a worker's health status. The required elements of an acceptable medical surveillance program are listed in the Occupational Safety and Health Administration standards for asbestos.

52. Miscellaneous ACM - asbestos-containing building material on interior structural components, structural members, or fixtures, such as floor and ceiling tiles; does not include surfacing material or thermal system insulation.

53. Movable Object - a unit of equipment or furniture in the work area, which can be removed from the work area.

54. MSHA - Mine Safety and Health Administration.

55. Negative Air Pressure Equipment - a local exhaust system capable of maintaining a constant low velocity air flow into the decontamination enclosure system and work area from adjacent unsealed areas. A differential pressure must be maintained at any point in the work area no less than -0.025 inches water gauge relative to the pressure at any point outside the work area at all times, unless otherwise noted or approved.

56. Negative Pressure Enclosure (NPE) System - approved work practice including smoke testing each shift, manometer testing to prove a minimum 0.02 inches w.g. pressure differential, a minimum of 4 air changes per hour, electrical circuits off unless GFI circuits, and air movement away from the workers towards the HEPA unit.

57. NESHAP - National Emission Standards for Hazardous Air Pollutants -- EPA Regulation 40 CFR Subpart M, Part 61.

58. NIOSH - National Institute of Occupational Safety and Health.

59. OSHA - Occupational Safety and Health Administration.

60. Perimeter Action Level - the 8-hour time weighted average (TWA) airborne concentration of total fibers to which an occupant, employee, building maintenance and operations employee, contract tradesman, or other building occupant may be exposed. The perimeter action level shall be 0.01 fibers per cubic centimeter for the Clean Room and Equipment Decontamination Assembly areas; and 0.005 fibers per cubic centimeter for the Elevator Lobby and Electrical Room areas, and other occupied areas. These concentrations shall be measured as total fibers greater than 5 micrometers in length per cubic centimeter of air within 95% confidence limits as determined by phase contrast microscopy (PCM) in accordance with the OSHA Reference Method.

61. Permissible Exposure Level (PEL) - a level of airborne fibers specified by OSHA as an occupational exposure standard for asbestos, which represents the 8-hour time-weighted average of 0.1 total fibers per cubic centimeter as measured by phase contrast microscopy.

62. Personal Air Monitoring - a method used to determine an individual's exposure to airborne fibers. The sample is collected outside the respirator in the person's breathing zone.

63. Phase Contrast Microscopy (PCM) - a method of analysis for air samples for fibers using a light microscope. PCM analyses are unable to distinguish asbestos fibers from non-asbestos fibers, such as fiberglass, cellulose, household dust, gypsum, etc.

64. Polarized Light Microscopy (PLM) - an optical microscopic technique used to distinguish between different types of asbestos fibers by unique optical properties.

65. Powered Air Purifying Respirator (PAPR) - either a full facepiece, helmet, or hooded respirator that has the breathing air powered to the wearer after it has been purified through a filter.

66. Pre-Cleaning - the process of cleaning (decontaminating) all objects, ceilings, wall and floors of a proposed work area using wet cleaning methods, HEPA vacuuming equipment, etc., before abatement work commences.

67. Presumed Asbestos-Containing Material (PACM) - TSI or surfacing (sprayed or troweled-on surfaces, not including mastics) material found in buildings constructed no later than 1980 considered to be ACM unless disproved by 3 random negative PLM samples of the homogeneous material. While not PACM, asphalt and vinyl flooring materials installed no later than 1980 are considered ACM unless proven by negative PLM samples otherwise.

68. Protection Factor (PF) - the ratio of the airborne fiber concentration outside the respirator relative to the airborne fiber concentration within the respirator facepiece.

69. Quality Control Representative (QCR) - the Contractor's representative who is responsible for:

    a. evaluating the work quality to insure that the area meets the criteria for acceptability prior to requesting an inspection, and

    b. notifying the Environmental Consultant in writing for all requests for inspections.

70. Qualitative Fit Test - a method of testing a respirator's face-to-facepiece seal by covering the inhalation or exhalation valves and either breathing in or out to determine the presence of any leak.

71. Removal - procedures necessary to strip all ACM from the designated areas and to dispose of these materials at an acceptable site.

72. Renovation - modification of any existing structure or portion thereof where exposure to airborne asbestos may result.

73. SDS - Safety Data Sheets, which are available from the vendor or supplier for all materials used on the project. SDS must be available at the site in accordance with the OSHA Hazard Communications Standard (29 CFR Part 1910.1299).

74. Self-Contained Breathing Apparatus (SCBA) - supplied air respirators in which a tank worn on one's back contains the air.

75. Shower Room - a room between the clean room and the equipment room in the worker decontamination enclosure system equipped with a shower. The shower will allow for complete showering during decontamination. Provide the shower with 60 minutes of continuous, warm running water at a temperature of 110 to 120°F, as well as providing liquid soap, and shampoo.

76. Staging Area - either the holding area or some area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

77. Static (Passive) Air Sampling - air monitoring without the use of fans or air circulating devices.

78. Surfacing ACM - asbestos-containing material that is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

79. Surfactant - a chemical wetting agent added to water to decrease surface tension and thus increase water's ability to wet or penetrate bulk materials.

80. Time Weighted Average (TWA) - the average concentration of an contaminant weighted according to the duration for each time period of measurement.

81. TLV - threshold limit value; levels of contaminants established by the ACGIH to which it is believed that most of the workers can be exposed with minimal adverse health effects.

82. Transmission Electron Microscopy (TEM) - a method of analyzing air samples for asbestos fibers using a transmission electron microscope and associated instrumentation.

83. TSI - thermal system insulation; asbestos-containing material applied to fittings, pipes, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

84. TWA - time weighted average.

85. Type C Supplied Air Respirator - a respirator designed to provide a very high level of protection, which supplies air to the wearer from an outside source, such as a compressor.

86. Visible Emissions - any emissions containing particulate asbestos material that are visually detectable without the aid of instruments, not including condensed water vapor.

87. Visual Inspection - a visual inspection by the Environmental Consultant of the work area under adequate lighting to ensure that the work area is free of visible asbestos material, debris, and dust.

88. Washroom - a room between the work area and holding area in the equipment decontamination enclosure system. The washroom comprises an airlock.

89. Wet Cleaning - the process of eliminating asbestos contamination from building surfaces and objects using cloths, mops, or other cleaning tools, which have been dampened with water, and by afterwards disposing of these cleaning tools as asbestos-contaminated waste.

90. Wetting Agents - materials that are added to water which are used for wetting the asbestos-containing material in order for the water to penetrate more effectively.

91. Work Area - designated rooms, spaces, zones, or areas of the project in which asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions.

A contained work area is one that has been sealed, plasticized, and equipped with a decontamination enclosure system and is regulated per 29 CFR Part 1926.1101 and DOSH Title 8 CCR Section 1529. A non-contained work area is an isolated or controlled-access work area which has not been plasticized nor equipped with a decontamination enclosure system.

92. Work Area Alert Level - 0.2 fibers/cc as measured by PCM inside the work area, either on an area or personal sample. Generally, levels higher than 0.2 fibers/cc will be viewed as a result of poor work practices.

93. Worker Decontamination Enclosure System - a decontamination system for workers consisting of a clean room, a shower room, and an equipment room.

94. Zone - see Work Area.

1.4 SUBMITTALS

A. Asbestos:

1. Submit the following, in accordance with Section 01 33 00 - Submittals, prior to Commencement of the Abatement Work:

a. Proof of current Asbestos Contractor's license (C-22) issued by the Contractors State License Board (CSLB) per California Business and Professions Code, Section 7058.5 et al for Contractor(s) disturbing greater than or equal to 100 square feet of ACCM (>0.1% asbestos) at any time on one site.

b. Worker documentation, including:

1). Current AHERA training certifications - supervisor/competent persons or annual 8-hr. refresher training certificate for work involving coring through friable asbestos substrates.

2). Current AHERA training certifications – workers or annual 8-hr. refresher training certificate for work involving coring through friable asbestos substrates.

3). Respiratory fit test records within the past 12 months minimum, or in compliance with 8 CCR 5144.

4). Medical examination approvals for respirator use within the past 12 months, or in compliance with 8 CCR 5144.

c. Safety Data Sheets (SDS) for chemicals used.

d. Emergency phone number and pager listing.

e. Rotameter calibration data within past six (6) months, where applicable (see Section 02 26 00 Asbestos and Lead Abatement Work Plan).

f. Negative Exposure Assessment, as warranted, where personal protective equipment differs from minimal requirements established by Cal/OSHA’s Construction Industry Standards.

2. Submit the following, in accordance with Section 01 33 00 - Submittals, within ten (10) calendar days of the request by the District or within ten (10) calendar days of completion of the abatement or hazard control work.

a. Contractor daily personal air-monitoring data.

b. Updated worker documentation, as needed.

c. Daily boundary access logs.

d. Copies of updated schedules and notices to regulatory agencies, as needed.

e. Receipt and weight tickets from landfill operator or incinerator, as applicable.

f. Copies of completed uniform waste manifests.

g. Certification of Completion.

h. List of quantity and location or remaining ACM within the Abatement Work Area per 8 CCR 1529 §k3c.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Asbestos Abatement Work: Only qualified persons shall engage in asbestos abatement activities. Work involving asbestos-containing materials exceeding 100 square feet (SF) or 100 linear feet (LF) shall be completed by a Contractor holding a valid asbestos handling license issued by the California State Contractors Licensing Board (SCLB) and a valid current Certificate of Registration for Asbestos-Related Work as issued by the California Department of Industrial Relations - Division of Occupational Safety and Health (Cal/OSHA). Work shall be completed under the on-site supervision of a Competent Person as defined by OSHA Regulation 29 CFR Part 1926.1101 (8 CCR 1529 in California). All abatement workers shall have AHERA training with annual 8-hour refresher training, current medical exams for the use of respiratory protection, and current fit test of appropriate respirators.

B. Regulatory Requirements: The Contractor shall be alerted to and familiar with the following laws and regulations regarding the hazards, control measures, management, characterizing, transport and disposal of hazardous wastes:

1. Asbestos Abatement Work: All labor, materials, facilities, equipment, services, employees and training, and testing necessary to perform the work required for asbestos abatement and disposal of waste shall be in accordance with these Specifications and the most current regulations, including but not limited to:

a. Environmental Protection Agency NESHAP and AHERA regulations (40 CFR Part 763, as applicable).

b. Occupational Safety and Health Administration (inclusive of OSHA 29 CFR 1926.1101)

c. California Department of Occupational Safety and Health (inclusive of Cal/OSHA 8 CCR 1529 and Injury and Illness Prevention Program regulation 8 CCR 3203)

d. California Environmental Protection Agency (Cal/EPA).

e. Bay Area Air Quality Management District (BAAQMD), Regulation 11, Rule 2.

f. Other applicable federal, state, and local governmental regulations pertaining to asbestos-containing materials (ACM) and asbestos waste.

C. Meetings:

1. Pre-Construction or Pre-Abatement Meeting:

a. Prior to any abatement work, the Contractor is to attend a pre-construction meeting to be attended by representatives of the District, the District's Consultants, the Contractor, the Hazardous Materials Abatement Subcontractor, and other Subcontractors whose work may be affected. The meeting agenda shall include the following considerations:

1). Review of the Specifications and Plans in detail related to the abatement and hazards work. All conflicts and ambiguities, if any, shall be discussed.

2). Review the project conditions, schedule, construction sequencing, abatement application requirements, and quality of completed work.

3). Review in detail the means of protecting adjoining areas, protect of Contractor's, Subcontractor's, District's workers, and completed work during the abatement activities.

4). Pre-job submittals requirements.

5). Site security requirements.

2. Weekly Meetings: At the District's option, abatement projects extending over one week in length may require attendance of the Contractor at a weekly progress meeting. The purpose of this meeting is to review abatement and project scheduling, coordination with other trades, security and site-specific requirements.

1.6 TIME LIMITATION AND DELAY CHARGES

A. Complete all asbestos, lead, and other hazard work specified in this Section in no more than the allotted calendar days or work shifts as outlined in the Abatement Work Plan or as otherwise specified in the Contract Documents.

1. In the event of failure to complete the Work of this Section within the specified time, the Contractor shall pay liquidated damages in the amount of twelve hundred dollar ($1,200.00) per calendar day for each day of delay in completion of work beyond the number of days specified in Paragraph 1.6A or Section 02 26 00 – Asbestos and Lead Abatement Work Plan. The specified amount of liquidated damages represents the District's estimate of costs which include, but are not limited to, those of the District and the District's Consultants for observations and inspections, daily air monitoring, equipment, transportation, and analysis charges which would be incurred by the District after the number of calendar days specified for completion of the Work of this Section.

PART 2 – PRODUCTS

2.1 ASBESTOS WORK - MATERIALS AND EQUIPMENT

A. Protective Devices:

1. Temporary wash stations or showers, disposable clothing, respirators, gloves, hard hats, and other required items.

2. Respirators shall protect against asbestos and other appropriate dusts, fumes and mists as approved by:

   a. the Mine Safety and Health Administration (MSHA).

   b. the National Institute for Occupational Safety and Health (NIOSH) under provisions of 30 CFR Part 11.

B. Waste Receptacles: Conform to federal and State regulations, with 6-mil minimum thickness or glovebags or waste bags.

C. Sealants and Polyethylene Sheeting:

1. Polyethylene sheeting shall be flame-retardant and approved and listed by the State Fire Marshal in accordance with Section 13121 and/or 13144.1 of the California Health and Safety Code.

   a. Thickness and Size: six (6) mil thick minimum, unless otherwise specified, sized to minimize the frequency of joints.

   b. Flammability: Comply with NFPA Standard 701 with a flame spread rating of no greater than five (<5) and a smoke development rating of no more than seventy (<70) when tested in accordance with ASTM E84 procedures.

2. Sealing Tape shall conform to the following:

   a. 2-inches or wider, capable of sealing joints of adjacent sheets of polyethylene and attaching polyethylene sheet to finished or unfinished surfaces or similar materials.

   b. Tape shall be capable of adhering under dry and wet conditions, including use of amended water.

3. Preservation Sealing Tape: Type specifically designed for adhering to critical or sensitive surfaces without damage to surface; 3M or equal.

4. Spray adhesives shall not contain methylene chloride or methyl chloroform (1,1,1- trichloroethane) compounds.

5. Fire resistant sealants shall be compatible with concrete, metals, wood, cable jacketing and other materials capable of preventing fire, smoke, water and toxic fumes from penetrating through sealants.

   a. Sealants shall be asbestos free and shall have a flame spread, smoke and fuel contribution of zero.

   b. Sealants shall be ASTM -and UL-rated for three (3) hours for standard method of fire test for firestop systems.

6. Lagging sealer for enclosing and sealing raw exposed edges of piping, fitting, equipment and duct insulation (as applicable) shall meet the requirements of NFPA 90A.

D. Surfactants and Encapsulants:

1. Wetting agents or surfactants shall be effective and compatible with the ACM and ACBM being wetted.

2. Bridging or penetrating type encapsulants shall have the following characteristics:

a. Water based. Do not utilize an organic solvent in which the solid parts of the encapsulant are suspended.

b. Non-flammable with no methylene chloride.

c. U.L. listed encapsulants, in full-scale ASTM E119 fire test, compatible with W.R. Grace "Retroguard, RG-1" fireproofing with "Spatterkote" Type SKII" bonding treatment for structural and decking widths exceeding twenty four (24) inches.

d. Compatible with replacement materials, especially mastics, fireproofing, and adhesives.

E. Mastic Removers shall conform to the following:

1. Non-flammable solvent or gel, with a flash point above one hundred and forty degrees Fahrenheit (>140 deg. F.).

2. Solvent waste shall not result in the generation of hazardous waste as described under 22 CCR, Division 4.

3. Removers shall not contain methylene chloride, halogenated hydrocarbons, or any of the following glycol ethers:

Common Name	Abbrev.	CAS#	Chemical Name
ethylene glycol methyl ether	EGME	109-86-4	2-methoxyethanol
ethylene glycol methyl ether acetate	EGMEA	110-49-6	2-methoxyethyl acetate
ethylene glycol ethyl ether	EGEE	110-80-5	2-ethoxyethanol
ethylene glycol ethyl ether acetate	EGEEA	111-15-9	2-ethoxyethyl acetate
ethylene glycol dimethyl ether	EGDME	110-71-4	1,2-dimethoxyethane
ethylene glycol diethyl ether	EGDEE	629-14-1	1,2-diethoxyethane
diethylene glycol	DEG	111-46-6	2,2'-dihydroxyethyl ether
diethylene glycol methyl ether	DEGME	111-77-3	2-(2-methoxyethoxy) ethanol
diethylene glycol ethyl ether	DEGEE	111-90-0	2-(2-ethoxyethoxy) ethanol
diethylene glycol dimethyl ether	DEGDME	111-90-6	bis(2-methoxyethoxy) ether
triethylene glycol dimethyl ether	TEGDME	112-49-2	2,5,8,11-tetraoxadodecane
dipropylene glycol	DPG	110-98-5	2,2-dihydroxyisopropyl ether

F. Vacuums and Negative Pressure Units (NPUs) used for clean-up of materials and detail shall be HEPA-filtered. Provide DOP testing on-site for all units, unless otherwise noted in the Contract Documents.

2.2 OTHER HAZARDOUS MATERIALS - MATERIAL AND EQUIPMENT

A. Waste Containers:

1. Provide sealable metal drums, 55-gallon capacity, with sealable lids. Label the drums in accordance with EPA and DTSC requirements, including the Generator I.D. or location identification and manifest number. Drums shall be air and water tight.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Review the hazardous material report(s) to familiarize oneself with hazardous material locations and conditions, and previous abatement by others, as applicable.

B. Review site conditions to verify quantities, work zones, available utilities, security, etc.

3.2 PREPARATION

A. Minimum Protective Procedures for Asbestos Work:

1. Protection of Visitors and Other Site Personnel: Cordon off the abatement area(s) with appropriate signs, and provide temporary tunneling or scaffolding, as applicable.

    a. Effective June 1, 2016 warning signs shall include the following information: “Danger, Asbestos, May Cause Cancer, Causes Damage to Lungs, Authorized Personnel Only.”

    b. In addition, where the use of respirators and protective clothing are required within regulated areas, the warning sign should include the following: “Wear Respiratory Protection and Protective Clothing in this Area.”

2. Respiratory Protection: Comply with Cal/OSHA Regulation 8 CCR Section 1529 and ANSI Standard Z88.2, “Practices for Respiratory Protection.” Use respirators approved by the National Institute for Occupational Safety and Health (NIOSH).

3. Provide site security to assure that no member of the public is able to gain access to the asbestos work area at any time. Maintain access and egress routes at all times.

4. Provide worker training, respiratory protection, and medical examinations to meet applicable regulations.

5. Provide temporary lighting and power to work areas, including installation of ground fault interrupters.

6. Fully ground all equipment within the work zone and decontamination assemblies.

7. Establish negative pressure in work area(s) as required under 8 CCR Section 1529. Note that where approved by the District, negative pressure units may be removed overnight from unoccupied building where site security and equipment are at risk. Under such conditions, the Contractor shall be responsible for sealing all openings and the decontamination assembly before completion of the day’s work and reestablishing negative pressurization of the zone before abatement commences.

8. Construct enclosure system(s) for worker and equipment decontamination.

9. Provide workers with sufficient sets of protective full-body clothing to be worn in the designated work area and whenever a potential exposure to airborne asbestos or potential safety hazards exists. Such clothing shall include but not be limited to: full-body coveralls, headgear, eye protection, and gloves. Disposable-type protective clothing, headgear, and footwear may be provided.

    a. Full-Body Clothing: Assure that workers wear hoods covering their hair in the designated work areas at all times. Do not wear protective clothing in lieu of street clothing outside the work area. Leave non-disposable-type protective clothing and footwear in the wash room until the end of the

asbestos abatement work. An acceptable alternative to disposal is proper storage in a sealed and labeled container so that containers would be opened and clothing reused only in an asbestos work area.

b. Eye protection: Provide eye protection to be worm as required by applicable safety regulations. Wear eye protection at all times within the asbestos work areas during all phases of work: preparation, removal, clean-up, encapsulation, waste handling, and similar operations. When appropriate, based on regulatory mandates, a full facepiece respirator may be worn to satisfy this requirement. Equipment shall conform to ANSI Z87.1. Use of contact lenses with respiratory protection is prohibited.

c. Head Protection: Provide hard hats or other head protection as required by applicable safety regulations, conforming to ANSI Z89.1, Class A or B.

d. Foot Protection: Provide nonskid footwear to all abatement workers, conforming to ANSI Z41.1, Class 75.

B. Site Protective Controls:

1. Protect against unnecessary disturbances or damages to sensitive finishes or furnishings that will remain within the facility.

2. Locate temporary scaffolding and containment barriers, as required, and proceed with the construction or demolition, allowing for continued operation of any adjacent occupied areas, as applicable.

3. Protect existing furnishings and building finishes from water, lead dusts, or chemical strippers.

4. Erect temporary protective covers over pedestrian walkways and at points of passage for persons or vehicles that are to remain operational during the lead hazard work.

5. Exterior lead hazard operations shall utilize mini-containments, drop cloths, wet methods, and HEPA vacuums as outlined in Cal/OSHA regulation 8 CCR Section 1532.1 and the HUD Guidelines, Chapter 8.

6. The District may evaluate the lead dust concentrations outside the work area on adjoining finishes during the work progress by collecting wipe samples to evaluate the integrity of the containment and to detect dust contamination.

7. Evaluation will review possible contamination resulting from:

a. Failure to adequately cordon off or contain work area dusts, clean-up debris, and use approved work practices, such as wet wiping and HEPA vacuuming.

b. Failure or breaches in the work area isolation containment.

c. Failure or rupture in the negative pressurization/HEPA filtration system.

d. Incomplete decontamination of personnel or equipment removed from the work area(s).

8. Perimeter wipe samples may be collected adjacent to each work area and compared to the pre-construction background concentrations. The District will analyze the wipe sample by flame atomic absorption per NIST Standard 1578.

9. The Contractor shall reclean adjoining occupied areas with surface concentrations exceeding background level or forty micrograms per square foot (>40 µg/SF) during the construction activities. The Contractor shall bear the costs (including engineering, administrative, housekeeping, analytical and the labor and materials costs of the District's consultant(s)) to return surface lead concentrations in elevated areas to acceptable levels.

3.3 ASBESTOS ABATEMENT PROCEDURES (AS APPLICABLE)

A. Notifications:

1. Notify, in writing, the BAAQMD ten (10) working days prior to commencement of any non-emergency asbestos project involving more than one hundred linear feet (>100 LF) or more than one hundred square feet (>100 SF) of asbestos materials.

2. Notify Cal/OSHA twenty four (24) hours in advance of any disturbances of any amount of friable or non-friable asbestos-containing materials or prior to performing asbestos-related work.

B. Interior Procedures (typical):

1. Thermal System Insulation (TSI):

a. Remove TSI as indicated on the Contract Drawings using full isolation or glovebag procedures per Cal/OSHA Regulation 8 CCR 1529, Work Class I, minimum.

b. Glovebag cut-out procedures may be used for services scheduled for demolition, as applicable.

c. Use wet methods and HEPA vacuums, setting up critical barriers for quantities greater than 25 LF

d. Seal HVAC systems and install drop cloths below and over nearby objects.

e. Ventilate away from the workers, using a HEPA filtration system.

f. Provide a full decontamination system with shower for abatement quantities exceeding twenty five linear feet (>25 LF) or as otherwise directed by the Contract Documents.

g. HEPA vacuum the entire contained area prior to reoccupancy air testing.

h. Glovebag abatement work, where applicable, requires two workers minimum and smoke testing of all bags prior to abatement.

i. Dispose of TSI in double goosenecked labeled bags or double wrap cut-out sections in 6-mil polyethylene sheeting and properly labeled as friable asbestos waste.

2. Asbestos Plasters and Sprayed-on Surfacing Materials:

a. Remove ACM as indicated on the Contract Drawings using full isolation or mini- containment procedures per Cal/OSHA Regulation 8 CCR 1529, Work Class I, minimum.

b. Use wet methods and HEPA vacuums.

c. Set-up critical barriers for quantities greater than twenty five square feet (>25 SF).

d. Seal HVAC systems and install drop cloths below and over nearby objects. Ventilate away from the workers, using a HEPA filtration system.

e. Provide a full decontamination system with shower for abatement quantities exceeding 25 LF or as otherwise directed by the Contract Documents.

f. HEPA vacuum the entire contained area prior to reoccupancy air testing.

g. Dispose of ACM in double goosenecked bags properly labeled as friable asbestos waste.

3. Vinyl Floor Tiles and Mastics:

a. Remove the flooring and mastics as indicated on the Contract Drawings using full isolation procedures, satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II.

b. Set-up critical barriers and splash guards and establish negative pressurization.

c. Remove the tiles using spud hoes and wet methods to minimize breakage and airborne fiber releases.

d. Remove the mastic using an approved ‘low odor’ mastic remover.

e. HEPA vacuum the contained area following abatement for reoccupancy testing; minimize use of encapsulant on substrates to be retiled.

f. Provide a bucket decontamination system unless otherwise indicated in 02 26 00 Asbestos and Lead Abatement Work Plan.

g. Dispose of tiles as Category 1 non-friable waste. Dispose of mastics generally as hazardous waste per the mastic removal manufacturer’s recommendations.

h. For removal of mastics utilizing mechanical buffers, submit 10 working days advance notice to BAAQMD, utilize full isolation procedures including a shower decontamination assembly, and dispose of mastics as friable asbestos waste

4. Vinyl Sheet Flooring and Mastics:

a. Remove the flooring and mastics as indicated on the Contract Drawings using full isolation procedures, satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II.

b. Set-up critical barriers and splash guards and establish negative pressurization.

c. Remove the sheeting using wet methods to minimize airborne fiber releases.

d. Remove the mastic using an approved ‘low odor’ mastic remover.

e. HEPA vacuum the contained area following abatement for reoccupancy testing; minimize use of encapsulant on substrates to be retiled.

f. Provide a full decontamination system with shower for areas exceeding twenty five square feet (>25 SF).

g. Dispose of sheeting as friable asbestos waste. Dispose of mastics generally as hazardous waste per the mastic removal manufacturer's recommendations.

h. For removal of mastics utilizing mechanical buffers, submit 10 working days advance notice to BAAQMD, utilize full isolation procedures including a shower decontamination assembly, and dispose of mastics as friable asbestos waste

5. Caulking:

a. Remove the caulking as indicated by the Contract Drawings by cordoning the work area, setting up drop cloths and abating using wet methods and HEPA vacuums per 8 CCR 1529 Work Class 2 procedures.

b. Cordon off the work area, installing critical barriers at the windows, doors, and other penetrations, as applicable.

c. Set-up drop cloths on the floor and nearby furnishings to contain falling materials on the ground or public access areas surrounding the work area.

d. HEPA vacuum the sills and frames following abatement.

e. Provide a bucket decontamination system, typical.

f. Dispose of caulking as Category 1 non-friable waste.

6. 'Trace' Asbestos Materials (Except Sheetrock Wallboard and Joint Compounds with Skimcoat):

a. Remove composite materials as indicated on the Contract Drawings using full isolation or mini-containment procedures within occupied building per Cal/OSHA Regulation 8 CCR 1529, Work Class II.

b. Use wet methods and HEPA vacuums, setting up critical barriers for occupied areas.

c. Set-up critical barriers for occupied areas.

d. For building demolition projects, cordon off the area and use dust control methods to minimize airborne fiber releases.

e. HEPA vacuum the entire contained area prior to reoccupancy testing for renovation projects.

f. Dispose of composite materials as "trace" (less than one percent (<1%)) asbestos waste, unless otherwise cross-contaminated with other asbestos or hazardous wastes.

7. Contaminated Non-Asbestos Materials:

a. Remove contaminated non-ACM substrates or underlying ceiling tiles, etc.

b. Use wet methods and HEPA-filtered vacuums to decontaminate, where feasible. Allow inspection of the decontaminated materials by the District's Environmental Consultant prior to removal from the work area.

c. Contaminated waste shall be disposed in double goosenecked bags or burrito- wrapped as friable asbestos waste.

d. Minimize excess waste quantities, where feasible.

8. Other: Remove and dispose in compliance with Cal/OSHA requirements under 8 CCR 1529 and AHERA requirements under 40 CFR Part 763.

C. Exterior Procedures (typical):

1. Roofing:

a. Remove the roofing as indicated by the Contract Drawings by cordoning the work area, setting up drop cloths and abating using wet methods and HEPA vacuums per 8 CCR 1529 Work Class 2 procedures.

b. Cordon off the work area, installing critical barriers at the roof vents, skylights, HVAC intake louver, etc., as applicable.

c. For buildings without parapet walls, set-up drop cloths on the ground and nearby objects to contain falling materials on the ground or public access areas surrounding the work area.

d. HEPA vacuum horizontal surfaces and HVAC rooftop equipment housings following abatement.

e. Provide a bucket decontamination system, typical.

f. Dispose of roofing as Category 1 non-friable waste, unless otherwise indicated.

2. Caulking:

a. Remove the caulking as indicated by the Contract Drawings by cordoning the work area, setting up drop cloths and abating using wet methods and HEPA vacuums per 8 CCR 1529 Work Class 2 procedures.

b. Cordon off the work area, installing critical barriers at the windows, doors, and other penetrations, as applicable.

c. Set-up drop cloths on the ground and nearby objects to contain falling materials on the ground or public access areas surrounding the work area.

d. HEPA vacuum the sills and frames following abatement.

e. Provide a bucket decontamination system, typical.

f. Dispose of caulking as Category 1 non-friable waste.

3. Window Glazing Putties:

a. Remove the glazing putties as indicated by the Contract Drawings by cordoning the work area, setting up drop cloths and abating using wet methods and HEPA vacuums per 8 CCR 1529 Work Class 2 procedures.

b. Cordon off the work area, installing critical barriers at the windows, doors, and other penetrations, as applicable. Remove the window sashes intact where demolition is indicated on the Contract Documents.

c. Set-up drop cloths on the ground and nearby objects to contain falling materials on the ground or public access areas surrounding the work area.

d. HEPA vacuum the sills and frames following abatement.

e. Provide a bucket decontamination system, typical.

f. Dispose of caulking as Category 1 non-friable waste.

4. Transite Shingles, Flues, or Paneling:

a. Remove the transite as indicated by the Contract Drawings by cordoning the work area, setting up drop cloths and abating using wet methods and HEPA vacuums per 8 CCR 1529 Work Class 2 procedures.

b. Cordon off the work area, installing critical barriers at the windows, doors, and other penetrations, as applicable. Remove the transite intact where demolition is indicated on the Contract Documents.

c. Set-up drop cloths on the ground and nearby objects to contain falling materials on the ground or public access areas surrounding the work area.

d. Where intact removal is infeasible, wrap transite with 2 layers of 6-mil polyethylene sheeting and break tiles, conduits, pipes or panels with a hammer. Double bag chips and pieces for disposal.

e. HEPA vacuum the sills, frames and surrounding substrates following abatement.

f. Provide a bucket decontamination system, typical.

g. Dispose of transite as Category 2 non-friable waste.

5. Other: Remove and dispose in compliance with Cal/OSHA requirements under 8 CCR 1529 and

D. Special Techniques and Procedures

1. Isolate HVAC system(s) to prevent contamination and fiber dispersal to other areas of the building.

a. Openings to ducts, fans, louvers, and plenums shall be sealed with two layers of polyethylene sheeting prior to the start of removal.

b. Provide caulked, rigid panels at the discretion of the District.

c. Repair any damage to ductwork, grilles, dampers, louvers, or HVAC equipment at the completion of the abatement work.

d. Secure systems and equipment using OSHA lock-out and tag-out procedures, as applicable.

2. Ensure that all electrical power terminating in the work area, including but not limited to outlets and lights are disconnected and cannot be reenergized during the course of the work.

a. Ensure that all power lines which transit the work area and are necessary for the continued operation of services in areas outside the work area are identified and protected adequately in order not to pose a hazard to workers during the course of work.

b. Provide temporary power and lighting, and ensure safe installation of temporary sources and equipment per applicable electrical code requirements, and provide safety lighting and ground fault interrupter circuits as power source of electrical equipment.

c. Secure systems and equipment using OSHA lock-out and tag-out procedures, as applicable.

3. Construct critical barriers and decontamination enclosure systems, as applicable. Erect polyethylene sheeting to protect walls, windows, flooring, and fixed equipment, as applicable.

4. Provide differential air pressure systems for each work area, where indicated, in accordance with Appendix J of the EPA's "Guidance for Controlling Asbestos-Containing Materials in Buildings," EPA 560/5-85-024.

a. Establish negative pressurization within all Asbestos Work Class 1 areas, exhausting air to the exterior, unless otherwise approved by the District.

b. Do not locate outlets near or adjacent to other building intake vents or louvers or at the entrances to the building.

c. Do not exhaust air into the building's interior spaces or within fifty (50) feet of the building's supply air intakes without on-site DOP testing of all NPUs to show a filter efficiency of ninety nine and ninety seven hundreds percent (99.97%) minimum.

d. Provide a minimum work area differential air pressure of twenty five hundredths inches water gauge (-0.025 inch w.g.) and four (4) air changes per hour at all times for Asbestos Work Class 1 areas or as otherwise designated by the Contract Documents.

5. Remove ACM employing full isolation, glovebag, and glovebag with mini-containment procedures as designated by material quantities and work class under Cal/OSHA regulation 8 CCR Section 1529.

a. Glovebag cut-out methods may be used for systems scheduled for demolition as outlined in the Demolition Plans.

b. Use wet cleaning methods, HEPA vacuuming, and proper work practices.

c. Mini-containments may not be required for glovebag TSI removal in unoccupied zones provided the bag is evacuated with a HEPA-filtered vacuum prior to the removal of the element being stripped or unless otherwise indicated in the Contract Documents. All areas requiring aggressive reoccupancy air sampling will require mini-containments or full containments and pre-cleaning throughout the isolated area using HEPA vacuums and wet methods.

6. As applicable to abatement of surfacing materials and non-glovebag thermal system insulation removal projects or for other work completed within full isolation containments, remove visible accumulations of asbestos material, debris, and dust from within the work area and its decontamination enclosure systems. Clean all surfaces within the work area.

7. Where encapsulation is required, encapsulate following the District’s pre-encapsulation inspection.

8. Minimize encapsulating of sensitive abated areas or surfaces, such as vinyl floor from wood or concrete substrates, so as not to affect the adhesion of replacement materials.

9. After encapsulation:

a. Remove the inner layer of polyethylene sheeting from the floor, walls, and other equipment.

b. Dispose as asbestos waste, as applicable.

c. Leave all critical barriers with one layer of polyethylene sheeting.

10. After removing the final layer of polyethylene sheeting (as appropriate):

a. Final-clean all surfaces, including the inner surface of the outer layer of polyethylene that serves as a critical barrier, any subfloor trenches, and similar locations.

b. Allow adequate time for settlement of dust, then repeat final cleaning operation.

c. Clean and remove all materials and equipment within the work area, using the equipment decontamination enclosure system.

11. Exterior Asbestos Work Class II abatement operations shall utilize critical barriers, drop cloths, wet methods, and HEPA vacuums as outlined under Cal/OSHA regulation 8 CCR Section 1529.

E. Field Quality Control

1. Site Tests: Reoccupancy Testing Criteria

a. Reoccupancy air samples using aggressive air sampling techniques shall be collected for all abatement zones, unless otherwise designated in the Contract Documents.

b. Phase Contrast Microscopy (PCM) Reoccupancy Testing: Areas cleared by PCM shall show an airborne concentration of total fibers for each sample at or below one hundredth fibers per cubic centimeter ($\leq$0.01 f/cc) using the NIOSH 7400A counting rules. Any sample result exceeding one hundredth fibers per cubic centimeter (>0.01 f/cc) shall require recleaning of the work area and retesting. The District, based on the quantity and types of materials removed, configuration, and sequencing of the work areas, and similar considerations, shall determine the minimum number of samples.

c. When transmission electron microscopy (TEM) Reoccupancy Testing are require, as designated by the Contract Documents, analysis shall be by the method described in 40 CFR Part 763, Appendix A, Subpart E (AHERA), with an analysis turn-around time of twenty four (24) hours, unless otherwise designated by the District. Z-test requirements under the AHERA regulations will not apply to any District projects.

d. The District shall pay the costs of the final round of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that will meet the Specifications. All rounds of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that fail to meet the contract criteria shall be borne by the Contractor. For the purpose of this paragraph, visual inspection includes the area isolation inspection, pre-encapsulation inspection, and final area cleanup inspection.

F. Waste Disposal and Manifesting:

1. Packing, labeling, transporting, and disposing of asbestos materials shall comply with Cal/EPA regulations under 22 CCR, including completion of the Uniform Hazardous Waste Manifest Form (DTSC 8022A, 7/92, and EPA 8700-22), and the requirements of “Waste Disposal and Manifesting,” discussed below.

3.4 WASTE DISPOSAL AND MANIFESTING

A. Hazardous Waste Disposal:

1. Packing, labeling, transporting, and disposing of hazardous waste shall comply with Cal/EPA regulations under 22 CCR, including completion of the Uniform Hazardous Waste Manifest Form (DTSC 8022A and EPA 8700-22). Waste and glovebags shall be properly labeled prior to their removal from the contained or regulated area, including all required asbestos warning labels.

    a. Effective June 1, 2016, bags or containers of protective clothing and equipment, scrap, waste, and debris containing asbestos fibers shall bear the following information: “Danger, Contains Asbestos Fibers, May Cause Cancer, Causes Damage to Lungs, Do not Breathe Dust, Avoid Creating Dust.”

2. Waste dumpsters shall be placarded, sealed, and locked overnight. Waste containers shall be stored to prevent public access or disturbances.

3. A "Waste Manifest" shall be completed for disposal of hazardous waste. The transporter shall posses a valid EPA Transporter I.D. number. The Contractor shall notify the District’s Project Manager at least forty-eight (48) hours prior to the time that the Manifest is required to be signed by the District.

4. Applicable information to be included in the "Waste Manifest" includes the following:

    a. EPA Generator I.D. Number: Verify with the Project Manager or the District’s Environmental Services Division.

    b. Generator's Name and Address: Verify with the District’s Project Manager.

    c. Generator Tax I.D. Number: Verify with the District’s Project Manager.

END OF SECTION 02 82 33

SECTION 02 83 33

REMOVAL AND DISPOSAL OF MATERIAL CONTAINING LEAD

TABLE OF CONTENTS

PART 1 – GENERAL....1

1.1 SUMMARY....1
1.2 REFERENCES....1
1.3 DEFINITIONS....2
1.4 SUBMITTALS....7
1.5 QUALITY ASSURANCE....8
1.6 TIME LIMITATION AND DELAY CHARGES....9

PART 2 – PRODUCTS....9

2.1 LEAD-RELATED WORK - MATERIALS AND EQUIPMENT....9
2.2 OTHER HAZARDOUS MATERIALS - MATERIAL AND EQUIPMENT....11

PART 3 – EXECUTION....11

3.1 EXAMINATION....11
3.2 PREPARATION....11
3.3 LEAD ABATEMENT AND HAZARD CONTROL....13
3.4 WASTE DISPOSAL AND MANIFESTING....18
3.5 FINAL PROJECT CLEAN-UP AND REOCCUPANCY CRITERIA....19

SECTION 02 83 33

REMOVAL AND DISPOSAL OF MATERIAL CONTAINING LEAD

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Minimum requirements for hazardous materials handling, control, and abatement activities, as applicable, including, but not necessarily limited to:

1. Hazardous materials controls.

2. Handling and disposal of lead-based paints and lead-containing materials.

3. Demolition associated with access to hazardous materials.

4. Criteria for abatement zone reoccupancy testing.

5. Criteria for reoccupancy testing.

B. All wall penetrations are to be treated as drilling through lead-based or lead-containing paints requiring dust controls. Work shall be conducted by personnel with lead awareness training per 8 CCR 1532.1 and the EPA's RR&P rules. Work shall be performed using High Efficiency Particulate Air (HEPA) filtered equipment, including vacuums, and shall utilize plastic sheeting, sponges, plastic waste bags, water and other required dust controls.

C. Plastic sheeting, minimum 5-ft. square, shall be positioned beneath all drilling or cutout locations and the area shall be closed off from occupancy and other trades using barrier tape. Holes shall be drilled through a wetted sponge or shave cream and debris immediately wiped up and placed within a sealed plastic bag. Most areas will be subject to visual inspections only and shall show no evidence of three-dimensional debris or recleaning will be required at the Contractor's cost.

D. Related Documents:

1. HUSD's AHERA and Lead-Based Paint (LBP) survey files with pertinent information attached to the Contract Documents, where applicable

E. Related Sections:

1. Section 02 26 00 –Lead Abatement Work Plan

2. Section 01 33 00 - Submittals.

3. Section 09 90 00 – Painting.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. E84: "Test Method for Surface Burning Characteristics of Building Materials."

2. E119: "Standard Method for Fire Tests of Building Construction and Materials."

B. American National Standards Institute (ANSI):

1. Z9.2: “Fundamentals Governing the Design and Operation of Local Exhaust Systems.”

2. Z41.1: “Men’s Safety Toe Footwear.”

3. Z86.1: “Commodity Specification for Air.”

4. Z87.1: “Practice for Occupational and Educational Eye and Face Protection.”

5. Z88.2: “Practices for Respiratory Protection.”

6. Z88.6: “Respiratory Protection - Respiratory Use Physical Qualifications for Personnel.”

7. Z89.1: “Requirements for Industrial Head Protection.”

C. National Fire Protection Association (NFPA):

1. Standard 10: “Fire Extinguishers.”

2. Standard 70: “National Electric Code.”

3. Standard 90A: “Fire Rating of Sprayed-On Fireproofing.”

4. Standard 701: "Small Scale Fire Test for Flame Resistant Textiles and Films."

D. California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA):

1. Title 8 California Code of Regulations (8 CCR) Section 5144 - Respiratory Protection.

2. Title 8 California Code of Regulations (8 CCR) Section 1532.1 - Construction Lead Standard.

3. Title 8 California Code of Regulations (8 CCR) Sections 3203 and 1509 - Injury and Illness Prevention Program.

E. U. S. Department of Housing and Urban Development (HUD): Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing,” referred to as the “HUD Guidelines.”

F. U.S. Environmental Protection Agency Renovation, Repair & Painting (RR&P) Rules, effective April 2010 and amendments thereto.

1.3 DEFINITIONS

A. Abatement: as defined by the Department of Public Health for lead hazards work, includes any set of measures designed to reduce or eliminate lead hazards.

B. Activity Class/Category - Lead: Lead hazard designations assigned to work activities that involve lead-containing materials. Activities that fall into Classes I through III, including as examples the operations defined below, are required to assume the following personal airborne exposure levels, unless otherwise demonstrated.

1. Activity Class I; exposure below five hundred micrograms per cubic meter (<500 µg/m^3).

a. Surface clean-up of lead-containing dust or debris less than fifteen thousand micrograms per square foot (<15,000 µ/SF);

b. Spray painting with lead-based paints; Manual demolition of structures (e.g. drywall, plaster, etc.);

c. Manual sanding, grinding, needle gunning, chiseling, hammering, wire brushing, milling or scraping of lead-based coatings;

d. Head gun removal of any surface coating; and power tool cleaning with dust collection systems.

2. Activity Class II; exposure greater tan five hundred micrograms per cubic meter (>500 µg/m^3) and less than twenty five hundred micrograms per cubic meter (<2,500 µg/m^3).

a. Using lead mortar;

b. Lead burning;

c. Rivet busting;

d. Power tool cleaning without dust collection systems;

e. Clean-up of dry abrasive; and

f. Abrasive blasting enclosure movement and removal

3. Activity Class III; exposure greater than twenty five hundred micrograms per cubic meter (>2,500 µg/m^3).

a. Abrasive blasting of any coated surfaces;

b. Welding on any coated surfaces;

c. Torching or cutting or any coated surfaces; and

d. Torch burning of any coated surfaces.

C. Air Monitoring - The process of measuring the lead content of a specified volume of air in a stated period of time.

D. Authorized Visitor - The Building Owner, or District's Representative, District's Consultant, or a representative of any regulatory or other agency having jurisdiction over the project.

E. Certified Lead Worker: includes those who do lead-related construction work activities on a work site under the directions of a Certified Lead Supervisor, including:

1. Removal, disposal or abatement of loose and peeling lead-based paints as defined by HUD, including scraping, demolition or other Cal/OSHA Activity 1 through 3 work as defined above.

2. Removal or repair of lead plumbing.

3. Repainting or general construction on surfaces painted with lead-based paints.

4. Removal, enclosing or covering of lead-contaminated soils.

5. Note that renovations, remodeling, painting, operations and maintenance work or other activities listed above that are considered to be interim controls, or lasting under twenty (20) years, may be completed by workers satisfying Cal/OSHA's lead awareness training requirements only.

F. Certified Lead Supervisor: includes those who supervise daily work activities on a lead-related construction site, as well as supervision of repainting or general construction performed on surfaces with lead-based paints where abatement is designed to permanently reduce or eliminate lead hazards for public (non-industrial) buildings or to last more than twenty (20) years. The Certified Lead Supervisor shall oversee the Certified Lead Workers, enforce safe work practices, and schedule and coordinate work site activities with the building occupants and other contractors and consultants.

G. Competent Person - An onsite supervisor who has been formally trained in lead related construction and who is capable of identifying lead hazards, substandard and improper lead abatement controls, procedures, practices, and conditions and who has sufficient experience and authority to take prompt corrective measures to eliminate them.

H. Containment: as defined by the California Department of Public Health includes any system. process or barrier used to contain lead hazards in a work area, including plastic sheeting, wet scraping, and other lead-safe work practices as described in the HUD Guidelines, Chapter 8.

I. CPSC – Consumer Products Safety Council.

J. Fixed Object - A unit of equipment or furniture in the Work Area that cannot be removed from the Work Area.

K. Hazardous Lead Waste - Lead paint debris shall be classified as hazardous due to the characteristic of toxicity, as determined by testing in accordance with the California Code of Regulations, Title 22, Division 4, Chapter 30, Article 11. Any substance(s) listed in Article 11 Section 66699 at concentrations greater than their listed Soluble Threshold Limit Concentration (STLC) or Total Threshold Limit Concentration (TTLC) may need to be further characterized by the Toxicity Characteristic Leaching Procedure (TCLP) in accordance with 40 CFR 261 and other tests prior to disposal as a hazardous waste.

L. HEPA Filter - A High Efficiency Particulate Absolute (HEPA) filter capable of trapping and retaining ninety-nine and ninety seven hundreds percent (99.97%) of lead particles greater than three-tenths (0.3) microns in diameter.

M. HEPA Vacuum Equipment - High efficiency particulate air (absolute) filtered vacuuming equipment with a filter system capable of collecting and retaining lead dust. Filters shall be certified to be of ninety-nine and ninety seven hundreds percent (99.97%) efficiency for retaining particles of three-tenths (0.3) microns diameter or larger.

N. Lead Dust Clean Up – Clean up and decontamination of all dust and debris in Work Area. For this project, clean up includes surfaces of the window opening including window sill, jamb, head, sliding window channel and weep holes, inside surface of window, and the surfaces of adjacent wall and floor area.

O. Lead-Based Paint (LBP) - Lead-based paint as defined by HUD, EPA, and California DHS is any paint with a lead content that equals or exceeds one-half percent ($\geq$0.5%) lead by weight or one milligrams of lead per square centimeter of surface area ($\geq$1 mg/cm^2).

P. Lead-Containing Paint (LCP) - is paint with any detectable level of lead. All paints shall be assumed to contain lead unless laboratory testing proves otherwise.

Q. Lead Paint Related Waste - Paint chips, vacuum dust, and debris, used cleaning articles, waste water, plastic sheets, and other disposable items which were used during the LBP stabilization process and as a

result are considered lead contaminated waste or assumed hazardous waste pending further characterization.

R. Lead Paint Surface Preparation - The process of conducting surface preparation to remove loose, flaking, deteriorated paint and sealing the resulting surfaces with primer and at least one finish coat of paint. Primers to be at least one (1) mil in thickness and finish coats to be at least one and on-half (1.5) mil in thickness.

S. Minor Repairs - Minor repair includes installation of reinforcement fasteners, installing or re-installing window latches, re-installing window glazing compounds, and freeing windows painted shut using methods which should not damage window components.

T. Notification: The process of notifying Owner's, tenants, Contractors, and/or regulatory agencies in advance of planned abatement activities impacting HUD-defined lead-based paints, includes but is not necessary limited to the following:

Agency	**Timeline**	**Min. Quantity**	**Posting**	**Project Type**	**Sent to:**
Cal/OSHA	24 Hrs. Prior to start of abatement	>100 SF or >1 hr. welding & torching	Job site	All building types	Fax to Local Cal/OSHA District office
CDPH Form 8551	Prior to start	>100 SF	Job site with copy to Building Owner	School Modernizations and Residential Designed for 20 year improvement with purpose of childhood lead prevention	CDPH Childhood Lead Poisoning Prevention Branch Reports, 850 Marina Bay Pkwy., Bldg. P, 3rd Floor, Richmond, CA 94804-6403; fax: (510) 620-5656
EPA RR&P 'Renovate Right' pamphlet	Deliver to Owner & Tenants with Affidavit of Receipt or Mail 7 days in advance of work	≥20 SF exterior or ≥6 SF interior	Job site	Residential & Institutional with Children Occupants Under Age 6	Owner, Tenants or Occupants

U. Owner - Owner of the Building/Property, i.e., the San Francisco Unified School District.

V. Owner's Representative - Person(s) designated or appointed by the District to represent them in all matters concerning the construction project at the site.

W. Owner's Environmental Consultant - The environmental consulting firm and individual representatives of that firm, hired to provide technical oversight, including observation and monitoring services during the lead stabilization phase of the project.

X. Owner's Construction Inspector – District's Painter Supervisor or Construction Inspector appointed by the Owner to inspect work for conformance with the Contract Documents.

Y. PPM – Part per million of lead. HUD-defined lead-based paints are defined as a concentration of 5,000 ppm or 0.5% by weight. The CPSC's standard for paints effective in 1978 was 600 ppm. The CPSC's limitation for lead in paints effective August 14, 2009 is 90 ppm.

Z. Qualified Person - The individual identified by the Contractor to be responsible for conducting air sampling, calibration of air sampling pumps, evaluating sampling results, and conducting respirator fit tests.

AA. Recognized Training/Educational Institution - University, college, or a professional training organization funded by or meeting U.S. Environmental Protection Agency (EPA) and/or California Department of Health Services (DHS) accreditation requirements for contractors performing lead-related construction work.

BB. Removal - All herein specified procedures necessary to remove and clean-up all lead-based paint (LBP) from the designated areas and to dispose of these materials at an acceptable site in accordance with Federal, State, and Local Regulations.

CC. Stabilization - See Lead Paint Surface Preparation.

DD. STLC – Soluble Threshold Limit Concentration; California extraction test for leachable lead established under Title 22 CCR at 5 mg/liter.

EE. TCLP – Toxicity Characteristic Leaching Procedures; Federal extraction test for lead at 5 mg/liter.

FF. TTLC – Total Threshold Limit Concentration per SW84 test for lead at 1,000 mg/kg.

GG. Visually Clean - Free of visible dust, paint chips, dirt, debris, or films removable by vacuuming or wet cleaning methods specified. For outside soil or ground cover areas, visually clean shall mean free of construction or paint debris, chips, or dust distinguishable from the initial soil or ground conditions.

HH. Wet Cleaning - The process of eliminating lead contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been washed with specified detergent solutions and rinsed with clean water. Includes use of 10% solution of chlorine bleach for mildew clean up.

II. Window Area - The window and associated components including but not limited to interior window sills (stool), exterior window sills on wood windows, window troughs and wells on metal and aluminum windows, framing, head, jamb and trim.

JJ. Window Sill (Interior) - That portion of the horizontal ledge that protrudes into the interior of the room, technically called a window stool.

KK. Window Sill (Exterior) - That portion of the horizontal window frame ledge that extends to the exterior. Usually includes window well or trough areas.

LL. Window Trough - That portion of the horizontal windowsill that receives both the upper and lower window sashes or double hung window when they are lowered; the metal channel on sliding windows; and the trough, well or depression in the metal frame at the bottom of steel casement windows.

MM. Window Well - Same as window trough.

NN. Work Area - Designated and controlled areas in which lead-based paint (LBP) stabilization, lead dust clean up and mildew clean up actions are undertaken or which may become contaminated as a result of such stabilization actions. A Work Area is a controlled area delineated at minimum by barrier tape (or similar means) and signage to restrict access to Authorized Personnel. In some instances a higher degree of physical isolation and control may be required and specified.

OO. Working Day - Monday through Friday, excluding legal and District holidays, during normal daytime hours. The amount of time allotted during each Working Day shall not exceed eight and one half (8.5) hours in length including one half (0.5) hour for lunch without prior District approval in writing.

1.4 SUBMITTALS

A. Lead-Related Work:

1. Submittals the following, in accordance with Section 01 33 00 - Submittals, prior to commencement of the lead-related work:

a. Worker documentation, including:

1). Current worker lead training certificates (see Section 02 26 00 Lead Abatement Work Plan for job specific requirements).

2). Respiratory fit test records within the past twelve (12) months minimum, or in compliance with 8 CCR 5144.

3). Medical examination approvals for respirator use within the past 12 months, or in compliance with 8 CCR 5144.

4). Blood lead test within past 90 days.

5). Current General Contractor or representative subcontractor's Certified Renovator's Certificate for work with regularly occupancy by children age 6 or younger.

b. Abatement Plan prepared by a Certified Lead Supervisor, Certified Lead Project Monitor, or Certified Lead Project Designer including:

1). Detailed lead hazards control and management measures, including the procedures and practices for protection of building occupants, public, and the environment.

2). A detailed description of abatement methods, locations and components where abatement is planned, signage and security measures.

3). A recommended schedule for reinspection.

4). Instructions to maintain potential lead hazards in safe condition.

5). Detailed plan for transportation and final disposal of lead paint and chip-related wastes generated by this work in accordance with all applicable Federal, State, and Local regulations. Provide name and address of waste transporter and disposal sites for lead hazardous wastes.

c. Notifications: Submit as applicable:

1). California Dept. of Health Services' Abatement of Lead Hazards Notification (Form 8551), generally limited to school modernization work.

2). Cal/OSHA Pre-Job 24-hr. Notification in accordance with Cal/OSHA 8 CCR 1532.1.

3). USEPA's RR&P 'Renovate Right' pamphlet and affidavit.

d. Safety data sheets (SDS) for chemicals used.

2. Submit the following, in accordance with Section 01 33 00 - Submittals, within five (5) calendar days of the request by the District or within five (5) calendar days of completion of the abatement or hazard control work.

    a. Updated worker documentation, as needed.

    b. Contractor periodic personal air-monitoring results.

    c. Receipt and weight tickets from landfill operator or recycler as applicable.

    d. Waste profiling data (TCLP, WET, and SW846, as applicable).

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Lead Abatement Work: Only qualified persons with CDPH approved Lead Workers training, current medical examinations and approval for the use of respiratory protection, and current fit testing of respirators under the direct supervision of a CDPH approved Lead Abatement Supervisor shall engage in work defined under Cal/OSHA regulation 8 CCR 1532.1 affecting lead-based paints and lead construction hazards, including but not limited to:

    a. Working in an environment where lead exposures exceed 30 micrograms per cubic meter.

B. Regulatory Requirements: The Contractor shall be alerted to and familiar with the following laws and regulations regarding the hazards, control measures, management, characterizing, transport and disposal of hazardous wastes:

1. Lead Hazard/Abatement Work: All labor, materials, facilities, equipment, services, employees and training, and testing necessary to perform the work required for lead abatement, demolition, decontamination, hazard control, and disposal of waste shall be in accordance with these Specifications and the most current regulations, including but not limited to:

    a. Environmental Protection Agency National Ambient Air Quality Standards, as applicable (40 CFR 61).

    b. Environmental Protection Agency’s Renovation, Repairs and Painting (RR&P) rules effective April 2010 and amendments thereto.

    c. Occupational Safety and Health Administration (inclusive of OSHA 29 CFR 1926.62).

    d. California Department of Occupational Safety and Health (inclusive of Cal/OSHA 8 CCR 1532.1).

    e. California Environmental Protection Agency (Cal/EPA), Title 22.

    f. California Department of Public Health (17 CCR Sections 35001 -35099).

    g. Other applicable federal, state, and local governmental regulations pertaining to lead hazards and lead waste.

C. Meetings:

1. Pre-Construction or Pre-Abatement Meeting:

    a. Prior to any abatement work, the Contractor is to attend a pre-construction meeting to be attended by representatives of the District, the District's Consultants, the Contractor, the Hazardous Materials Abatement Subcontractor, and other Subcontractors whose work may be affected. The meeting agenda shall include the following considerations:

        1). Review of the Specifications and Plans in detail related to the abatement and hazards work. All conflicts and ambiguities, if any, shall be discussed.

        2). Review the project conditions, schedule, construction sequencing, abatement application requirements, and quality of completed work.

        3). Review in detail the means of protecting adjoining areas, protect of Contractor's, Subcontractor's, District's workers, and completed work during the abatement activities.

        4). Pre-job submittals requirements.

        5). Site security requirements.

2. Weekly Meetings: At the District's option, abatement projects extending over one week in length may require attendance of the Contractor at a weekly progress meeting. The purpose of this meeting is to review abatement and project scheduling, coordination with other trades, security and site-specific requirements.

1.6 TIME LIMITATION AND DELAY CHARGES

A. Complete all lead, and other hazard work specified in this Section in no more than the allotted calendar days or work shifts as outlined in the Abatement Work Plan or as otherwise specified in the Contract Documents.

PART 2 – PRODUCTS

2.1 LEAD-RELATED WORK - MATERIALS AND EQUIPMENT

A. Protective Devices:

1. Polyethylene drop cloths and dust barriers, temporary wash stations or showers, disposable clothing, respirators, gloves, hard hats, and other required items.

2. Respirators shall protect against lead and other appropriate dusts, fumes and mists as approved by:

    a. The Mine Safety and Health Administration (MSHA).

    b. The National Institute for Occupational Safety and Health (NIOSH) under provisions of 30 CFR Part 11.

B. Sealants and Polyethylene Sheeting:

1. Polyethylene sheeting shall be flame-retardant and approved and listed by the State Fire Marshal in accordance with Section 13121 and/or 13144.1 of the California Health and Safety Code.

a. Thickness and Size: 6-mil thick minimum, unless otherwise specified, sized to minimize the frequency of joints.

b. Flammability: Comply with NFPA Standard 701 with a flame spread rating of no greater than five (<5) and a smoke development rating of no more than seventy (<70) when tested in accordance with ASTM E84 procedures.

C. Sealing Tape shall conform to the following:

1. 2-inches or wider, capable of sealing joints of adjacent sheets of polyethylene and attaching polyethylene sheet to finished or unfinished surfaces or similar materials.

a. Tape shall be capable of adhering under dry and wet conditions, including use of amended water.

b. Preservation Sealing Tape: Type specifically designed for adhering to critical or sensitive surfaces without damage to surface; 3M or equal.

c. Spray adhesives shall not contain methylene chloride or methyl chloroform (1,1,1-trichloroethane) compounds.

d. Fire resistant sealants shall be compatible with concrete, metals, wood, cable jacketing and other materials capable of preventing fire, smoke, water and toxic fumes from penetrating through sealants.

1). Sealants shall be asbestos free and shall have a flame spread, smoke and fuel contribution of zero.

2). Sealants shall be ASTM -and UL-rated for three (3) hours for standard method of fire test for firestop systems.

D. Provide waste receptacles that meet federal and State regulations.

E. Paint Removers shall conform to the following:

1. Non-flammable removing solvents or gels, with a flash point above one hundred and forty degrees Fahrenheit (>140 deg. F.).

2. Solvent waste shall not result in the generation of hazardous waste as described under 22 CCR, Division 4.

3. Removers shall not contain methylene chloride, halogenated hydrocarbons, or any of the following glycol ethers.

Common Name	Abbrev.	CAS#	Chemical Name
ethylene glycol methyl ether	EGME	109-86-4	2-methoxyethanol
ethylene glycol methyl ether acetate	EGMEA	110-49-6	2-methoxyethyl acetate
ethylene glycol ethyl ether	EGEE	110-80-5	2-ethoxyethanol
ethylene glycol ethyl ether acetate	EGEEA	111-15-9	2-ethoxyethyl acetate
ethylene glycol dimethyl ether	EGDME	110-71-4	1,2-dimethoxyethane
ethylene glycol diethyl ether	EGDEE	629-14-1	1,2-diethoxyethane
diethylene glycol	DEG	111-46-6	2,2'-dihydroxyethyl ether
diethylene glycol methyl ether	DEGME	111-77-3	2-(2-methoxyethoxy) ethanol
diethylene glycol ethyl ether	DEGEE	111-90-0	2-(2-ethoxyethoxy) ethanol
diethylene glycol dimethyl ether	DEGDME	111-90-6	bis(2-methoxyethoxy) ether
triethylene glycol dimethyl ether	TEGDME	112-49-2	2,5,8,11-tetraoxadodecane
dipropylene glycol	DPG	110-98-5	2,2-dihydroxyisopropyl ether

F. Cleaning Agents: Cleaning agents, equipment, and methods employed shall not in any way damage the substrate or adjoining surfaces and finishes. Cleaning solvents shall be non-injurious to the surfaces upon which they are applied. The methods used shall cause no pitting, erosion or damages to the surfaces.

1. Do not use chemicals that may attach or leave deposits on the substrate material.

2. Modify the process or processes to suit the finish, hardness, and condition of the surface to be cleaned.

G. Vacuums and negative pressure units shall be HEPA-filtered for clean-up of loose debris and contaminants. Provide DOP testing on-site for all units, unless otherwise noted in the Abatement Work Plan.

2.2 OTHER HAZARDOUS MATERIALS - MATERIAL AND EQUIPMENT

A. Waste Containers:

1. Provide sealable metal drums, 55-gallon capacity, with sealable lids, as necessary. Label the drums in accordance with EPA and DTSC requirements, including the Generator I.D. or location identification and manifest number. Drums shall be air and water tight.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Review the hazardous material report(s) to familiarize oneself with hazardous material locations and conditions, and previous abatement by others, as applicable.

B. Review site conditions to verify quantities, work zones, available utilities, security, etc.

3.2 PREPARATION

A. Minimum Protective Procedures for Lead-Related Work:

1. Follow, at the minimum, dust control procedures as outlined under Cal/OSHA regulation 8 CCR 1532.1, the EPA’s RR&P rules, and CDPH regulation 17 CCR Sections 35001 through 36100, as applicable.

2. Respiratory Protection: Comply with Cal/OSHA Regulations included in 8 CCR Section 1532.1 and ANSI Standard Z88.2, "Practices for Respiratory Protection."

a. Use respirators approved by the National Institute for Occupational Safety and Health (NIOSH).

b. Provide respiratory protection to employees involved with lead-based paint demolition and/or abatement elements or as required for demolition work where employees may be occupationally exposed to lead at or exceeding the Action Level (AL) at no cost to the employees or District.

c. Workers shall wear appropriate respiratory protection during lead hazards work, unless initial testing verifies that employee exposures are below the Action Level.

3. Site security to assure that no member of the public is able to gain access to regulated work areas. Maintain access and egress routes at all times.

4. Worker training, respiratory protection, medical examinations, and blood lead monitoring to meet applicable regulations.

5. Activity Class I work areas, as a minimum, with a two (2) stage decontamination assembly, including an equipment and contiguous clean room with bucket wash-up facilities positioned as follows:

a. Equipment Room shall have lockers or labeled bags and containers for storing contaminated protective clothing and equipment.

b. Clean Room shall have lockers or containers for storing employee's street clothes and personal items. Clean Room shall also contain a suitable supply of potable water to permit each employee to wash his or her hair, hands, forearms, face and neck.

6. Sufficient sets of protective full-body clothing for workers to be worn in designated work area and/or whenever a potential airborne lead hazard exists. Clothing shall include, but not be limited to, full-body coveralls, headgear, eye protection, and gloves. Disposable-type protective clothing, headgear and footwear are acceptable.

7. Full-Body Clothing: Workers shall wear hoods covering their hair in the designated lead hazard work areas at all times.

a. Wearing of protective clothing, in lieu of street cloths, outside the work area is not permitted.

b. Non-disposable-type protective clothing and footwear shall be left in the Wash Room decontamination assembly for disposal.

c. The use of cloth coveralls following the prescribed laundry procedures as identified in 8 CCR, 1532.1 is acceptable.

8. Eye Protection: Eye protection, conforming to ANSI Z87.1 shall be worn at all times within the lead hazard areas.

9. Head Protection: Hard hats or other head protection as required by applicable safety regulations and conforming to ANSI Z89.1, Class A or B.

10. Foot Protection: Construction workers shall use non-skid footwear conforming to ANSI Z41.1, Class 75.

B. Site Protective Controls:

1. Protect against unnecessary disturbances or damages to sensitive finishes or furnishings that will remain within the facility.

2. Locate temporary scaffolding and containment barriers, as required, and proceed with the construction or demolition, allowing for continued operation of any adjacent occupied areas, as applicable.

3. Protect existing furnishings and building finishes from water, lead dusts, or chemical strippers.

4. Erect temporary protective covers over pedestrian walkways and at points of passage for persons or vehicles that are to remain operational during the lead hazard work.

5. Exterior lead hazard operations shall utilize mini-containments, drop cloths, wet methods, and HEPA vacuums as outlined in Cal/OSHA regulation 8 CCR Section 1532.1 and the HUD Guidelines, Chapter 8.

6. The District may evaluate the lead dust concentrations outside the work area on adjoining finishes during the work progress by collecting wipe samples to evaluate the integrity of the containment and to detect dust contamination.

7. Evaluation will review possible contamination resulting from:

   a. Failure to adequately cordon off or contain work area dusts, clean-up debris, and use approved work practices, such as wet wiping and HEPA vacuuming.

   b. Failure or breaches in the work area isolation containment.

   c. Failure or rupture in the negative pressurization/HEPA filtration system.

   d. Incomplete decontamination of personnel or equipment removed from the work area(s).

8. Perimeter wipe samples may be collected adjacent to each work area and compared to the pre-construction background concentrations. The District will analyze the wipe sample by flame atomic absorption per NIST Standard 1578.

9. The Contractor shall reclean adjoining occupied areas with surface concentrations exceeding background level or forty micrograms per square foot (>40 µg/SF) during the construction activities. The Contractor shall bear the costs (including engineering, administrative, housekeeping, analytical and the labor and materials costs of the District's consultant(s)) to return surface lead concentrations in elevated areas to acceptable levels.

3.3 LEAD ABATEMENT AND HAZARD CONTROL

A. Notifications: Cordon off active lead hazard and abatement zone(s) and post with warning signs at entries to regulated areas bearing the following information:

Danger
Lead Work Area
May damage fertility
Or the unborn child
Causes damage to
The central nervous system
Do not eat, drink or
Smoke in this area

B. Procedures:

1. Abatement of lead-based paints and presumed lead-based paints as defined by HUD and as regulated under the California Department of Public Health's Title 17, California Code of Regulations (CCR), Division 1, Chapter 8, "Accreditation, Certification, and Work Practices in Lead-Related Construction," Article 1, Sections 35001 et al, and Article 16, Sections 36000 and 36100 shall:

   a. Include posting and delivery of notifications prior to conducting abatement, including:

      1). Completing CDPH Form 8551 (12/97) and posting all entrances to the structure at least 5 days prior to conducting abatement. The posted form shall not be removed until abatement is completed and a reoccupancy inspection has been conducted.

      2). Deliver of the completed CDPH Form 8551 to the Department of Public Health, c/o Notification at the Childhood Lead Prevention Program Branch, 850 Marina Bay Parkway, Building P, 3rd Floor, Richmond, CA 94804-6403; fax: (510) 620-5656.

      3). Retain records of notification for at least three (3) years.

      4). Notifications posted per the San Francisco Dept. of Building Inspections for interior and exterior lead abatement work, prior to the beginning of work, as well as 3 business days prior notification to adjoining properties for exterior abatement work per San Francisco Building Code, Chapter 36.

   b. Be conducted only by a Certified Lead Supervisor or a Certified Lead Worker. The Certified Lead Supervisor shall be on-site during all work site preparation and during the post-abatement clean-up of work areas. At all other times when abatement is conducted, the Certified Lead Supervisor shall be on-site or available by telephone, pager or answering service, and able to be present at the work area in no more than two (<2) hours.

   c. Be conducted using containment in a manner such as not to contaminate non-work areas with lead dust, soil, or paint debris.

   d. Be conducted in accordance with procedures specified in the HUD Guidelines, Chapters 11 and 12.

C. Loose and Peeling Paint:

1. Scrape loose and peeling paints using dust control procedures and procedures as outlined under Cal/OSHA Regulation 8 CCR 1532.1.

2. Characterize the waste for possible disposal as a hazardous waste.

D. Lead Paint Abatement:

1. Remove paints on structural steel components scheduled for welding or torching using a chemical stripper, needle gun or other approved methods as outlined in the approved Contractor's Hazardous Materials Management Plan (HMMP). Note that spot abatement of structural steel components does not eliminate the possible need for respiratory protection and hazard controls by the welder or torcher under 8 CCR 1529 due to unabated residues or paints on back-to-back components, which can not be accessed for abatement.

2. Use drop cloths, polyethylene barriers, Hudson and airless sprayers and other methods as required for dust control.

3. Characterize and dispose of paints, rags, etc., separately for possible disposal as a hazardous waste.

E. Lead Dust Clean-up:

1. Clean-up background or construction-related dusts from demolition of lead-coated elements or other contaminant sources using wet methods and HEPA-filtered vacuums.

2. Do not dry sweep.

F. Lead Hazard Control:

1. Scrape loose and peeling paints and use dust controls for demolition of lead- coated architectural and structural elements as indicated by the Demolition Plans, following minimum procedures as outlined under Cal/OSHA Regulation 8 CCR 1532.1.

2. Remove and dispose of intact lead-coated architectural and structural elements as non-hazardous waste.

3. HEPA vacuum residual debris and wet wipe affected substrates as required for reoccupancy inspection or testing.

G. Special Procedures and Techniques:

1. Cordon off the proximity (within approximately 20 feet) of Activity Class I work areas using construction tape, polyethylene dust barriers, or other appropriate means.

a. Persons entering the regulated "cordoned" work area shall wear appropriate respiratory protection and full body coveralls.

b. Affix appropriate warning signs at the entry and approaches to the regulated area(s).

2. Lockout electrical and HVAC equipment within the regulated area as necessary.

3. Protect floors, furnishings, landscaping, and other items with polyethylene drop cloths or other acceptable means to prevent contamination or damage to other building surfaces and finishes.

4. Apply chemical strippers and scrape following the manufacturer's recommended procedures. After scraping, remove remaining loose paint with a HEPA vacuum.

5. Maintain work area surfaces as free as practicable from accumulated dust or debris. Clean equipment, tools and containment structures within regulated areas, at a minimum, with HEPA vacuums or wet methods.

6. Conduct operations to prevent injury to adjoining facilities, persons, motor vehicles, and other items as applicable.

a. Prevent chemical cleaning agents from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other items and other surfaces that could be injured or damaged by such contact.

b. Do not spray or scrape outdoors during winds of sufficient force to spread cleaning agents to unprotected surfaces.

7. For areas where removal of loose and peeling paints only are required, the Contractor shall ensure that the paint that remains on walls, ceilings, eaves, and other surfaces in areas of active work, as applicable, shall be adhered to the substrate sufficiently to support eventual repainting. Paints that peel or loosen during wetting will become part of the scope of work scheduled for removal and disposal.

8. Where complete removal of lead coats is required, finished work shall show no signs of stains, scratches, streaks, or runs of discoloration from use of cleaners.

   a. Leave substrate surfaces neat and clean, including removal of primers in addition to finish coats. Surfaces shall be uniformly cleaned.

   b. Neutralize substrate using a TSP and detergent wash.

9. Where mechanical sanding or removal of lead-based paints is required, the Contractor shall fully contain the work area, establish negative pressurization of the contained zone, and attach HEPA-filtration devices to all mechanical tools. Upgrades in respiratory protection shall be provided as required under 8 CCR 1532.1.

10. Avoid direct welding or cutting on surfaces containing lead coatings by mechanically or chemically removing the coating to a distance of at least four to six inches outboard in all directions from the point at which heat is applied.

    a. If surface coatings are not removed prior to welding or cutting, provide local exhaust ventilation to capture the aerosolized lead, using HEPA filters.

    b. If surface coatings are not removed prior to torching or welding, provide upgraded welder's respiratory protection in compliance with Cal/OSHA regulation 8 CCR 1532.1.

    c. Complete similar advance stripping for surfaces with Chromium VI or cobalt coatings.

11. Where mechanical removal of surface coatings constitutes a Level II activity, provide power tools, to the extent feasible, with local HEPA exhaust or dust collector systems to capture the aerosolized lead.

H. Demolition Procedures:

1. Removal of obstructing materials as needed for access to hazardous materials.

2. Removal of obstructing materials where hazardous materials contamination is known to exist.

3. Removal of obstructing materials where hazardous materials exposure is likely to result.

4. Follow, at the minimum, the protective procedures as outlined in Cal/OSHA regulation 8 CCR 1532.1.

5. Protection of Visitors and Other Site Personnel: Cordon off the abatement area(s) with appropriate signs, and provide temporary tunneling or scaffolding, as applicable.

6. Respiratory Protection: Comply with Cal/OSHA Regulation 8 CCR Section 1529 and ANSI Standard Z88.2, "Practices for Respiratory Protection." Use respirators approved by the National Institute for Occupational Safety and Health (NIOSH).

I. Prohibited Activities:

1. Workers shall decontaminate themselves and appropriate equipment prior to eating, drinking and smoking.

2. Clean debris and surfaces with HEPA-filtered vacuums or wet methods.

3. Shoveling, wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and are found to be ineffective.

J. Field Quality Control

1. Site Test: Monitoring and Reoccupancy by the District:

a. During lead hazard-related work, such as demolition, refinishing, or torching and welding activities, the District may collect air samples for analysis by flame atomic absorption.

b. Air sampling results in excess of the Cal/OSHA "Project Action Level" of thirty micrograms per cubic meter (30 µg/m^3) within the construction zone may require isolation of the work area, upgrades in the required respiratory protection, amendment of work procedures, and/or clean-up of the affected area.

c. Air sampling results in excess of the EPA's National Ambient Air Quality Standard (NAAQS) of one and one-half micrograms per cubic meter (1.5 µg/m^3) at the site's property line or at adjoining occupied non-construction areas may require isolation of the work area, amendment of work procedures, and clean-up of the affected area.

d. Resampling of the contaminated areas and handling, shipping, and analysis charges (including the District's time and expenses) for additional sampling required to show background levels below these lead standards shall be borne by the Contractor.

K. Reoccupancy Criteria -- Lead Abatement Zones:

1. The lead abatement zone shall remain secured until cleared by the District.

2. Visual Inspection:

a. When the Contractor considers the work or a designated portion of the work to be complete, the Contractor shall notify the District's Project Manager that the work is ready for abatement zone reoccupancy inspection.

b. Within a reasonable time after receiving notification from the Contractor, the District will perform a visual inspection of the work area.

c. Evidence of lead contamination identified during the inspection will necessitate further cleaning as specified herein.

3. Wipe Sample Reoccupancy Criteria: The Contractor shall reclean the area if surface concentrations exceed the following "EPA Reoccupancy Dust Standards:"

10 micrograms/ft^2	for floors
100 micrograms/ft^2	for interior window sills and stools

4. Resampling of the contaminated areas and handling, shipping, analysis charges (including the District's time and expenses) for additional sampling required to show background levels below these lead standards shall be borne by the Contractor.

L. Waste Disposal and Manifesting:

1. Comply with current federal, State and local regulations concerning the waste handling, containerization, transportation, and disposal of lead-based paint or lead-contaminated materials as discussed under "Waste Disposal and Manifesting" below.

2. Loose debris and scraped materials shall be treated as hazardous waste, unless otherwise approved by the District. Construction waste coated with intact LBP may be disposed of as construction debris in accordance with the Cal/EPA requirements.

3. Laboratory costs associated with analyses required for disposal, if required, shall be at the Contractor's expense.

4. Segregate, containerize, and characterize construction debris including rags, protective coveralls, polyethylene sheeting, and other consumable items. Waste shall be packaged in accordance with the applicable U. S. Department of Transportation regulations included in 49 CFR Parts 173, 178 and 179.

5. Profile waste with an approved landfill or incinerator by means of standard digestion and extraction tests (TCLP, WET, and SW846), as appropriate. Use the facility's EPA Generator I.D. number on the "Waste Manifest." See additional requirements specified below in Article titled "Manifesting."

6. If debris is to be recycled, provide a bill of lading and a memorandum from the recycler acknowledging that lead may be present and work activities and disposal will comply with applicable regulations. Submit in accordance with procedures of Section 01 33 00 - Submittals.

3.4 WASTE DISPOSAL AND MANIFESTING

A. Hazardous Waste Disposal:

1. Packing, labeling, transporting, and disposing of hazardous waste shall comply with Cal/EPA regulations under 22 CCR, including completion of the Uniform Hazardous Waste Manifest Form (DTSC 8022A and EPA 8700-22). Waste and glovebags shall be properly labeled prior to their removal from the contained or regulated area, including all required lead warning labels.

2. Waste dumpsters shall be placarded, sealed, and locked overnight. Waste containers shall be stored to prevent public access or disturbances.

3. A "Waste Manifest" shall be completed for disposal of hazardous waste. The transporter shall posses a valid EPA Transporter I.D. number. The Contractor shall notify the District's Project Manager a least forty eight (48) hours prior to the time that the Manifest is required to be signed by the District.

4. Applicable information to be included in the "Waste Manifest" includes the following:

a. EPA Generator I.D. Number: Verify with the District's Project Manager.

b. Generator's Name and Address: Verify with the District's Project Manager.

c. Generator Tax I.D. Number: Verify with the District's Project Manager.

3.5 FINAL PROJECT CLEAN-UP AND REOCCUPANCY REOCCUPANCY CRITERIA

A. Lead:

1. Final Reoccupancy Cleaning:

a. Final clean-up prior to District reoccupancy shall include wet wiping using a TSP solution and HEPA vacuuming all suspect dust and debris areas.

b. Areas that do not comply with the “Final Reoccupancy Clearance Criteria" shall continue to be cleaned by and at the Contractor's expense until the specified criteria is achieved, as evidenced by results of inspections as previously specified.

END OF SECTION 02 83 33

SECTION 01 3900

COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Coordination and project conditions.

B. Related work.

C. Discrepancies.

D. Examination.

E. Pre-Contract meeting.

F. Pre-construction meeting.

G. Site mobilization meeting.

H. Progress meetings.

I. Pre-installation meetings.

J. Project coordination meetings.

1.02 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of the various portions of the Contract Documents to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate hours and days of Work with local ordinances and requirements.

C. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

H. Contractor shall coordinate Work with work to be performed by separate contractors as listed in Section 01 1100 - Summary of Work.

1.03 RELATED WORK

A. Referencing specification sections in "Related Work" articles is for convenience only and shall not be construed as to limit the coordination of the Contract Documents to referenced sections.

B. Documents affecting the work of any section include, but are not limited to, General Conditions, Supplementary General Conditions, and Sections in Division 01 of these Specifications.

C. Work in any section may relate to other work in these documents. The Contractor is responsible to coordinate all work.

1.04 DISCREPANCIES

A. In the event of discrepancy in the Contract Documents or if uncovered conditions are not as anticipated, immediately notify the Architect and secure needed direction.

B. Do not proceed in areas of discrepancy until such discrepancies have been fully resolved.

C. Before starting work, verify governing dimensions at the premises, and examine adjoining work on which this work is dependent. No "Extra" or additional compensation will be allowed on account of differences between actual measurements and dimensions shown. Submit differences discovered during the work to Architect for interpretation before proceeding with the associated work.

D. Any time extension or any increase or decrease of cost resulting from such changes will be adjusted in the manner provided in the General Conditions.

1.05 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Examine and verify specific conditions described in individual specification sections.

C. Verify that utility services are available, of the correct characteristics, and in the correct location.

1.06 PRE CONTRACT MEETING

A. Architect will schedule a meeting with District and apparent low bidder prior to award of Contract.

B. Attendance Required: Owner, Architect, and Contractor.

C. Agenda: Execution of the Notice of Award, Review of documents required for Preconstruction Meeting.

1.07 PRECONSTRUCTION MEETING

A. Architect will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Architect and Contractor.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of schedule of values.
5. Designation of personnel representing the parties in Contract, and the Architect/Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Scheduling activities of DSA Inspector of Record.

D. Architect will record minutes and distribute copies within five days after meeting to participants, and those affected by decisions made.

1.08 SITE MOBILIZATION MEETING

A. Architect will schedule a meeting at the Project site prior to Contractor occupancy.

B. Attendance Required: Owner, Architect, Special Consultants, Contractor, Contractor's Superintendent and major Subcontractors.

C. Agenda:
1. Use of premises by Owner and Contractor.
2. Owner's requirements and partial occupancy.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Security and housekeeping procedures.
6. Schedules.
7. Application for payment procedures.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for start-up of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Architect will record minutes and distribute copies within five days after meeting to participants, and those affected by decisions made

1.09 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at bi-weekly intervals. Provide and discuss "two-week look ahead" schedule reports at these progress meetings. Coordinate progress payments and revised schedule, to monthly meeting attended by an officer of the construction company.

B. Make arrangements for meetings, prepare agenda with copies for participants and preside at meetings.

C. Attendance Required: Job Superintendent, major Subcontractors and suppliers, Owner, Inspector of Record and Architect as appropriate to agenda topics for each meeting.

D. Architect will record minutes and distribute copies within five days after meeting to participants, including Owner, Contractor, and those affected by decisions made.

1.10 PREINSTALLATION MEETING

A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of installation, preparation and installation procedures.
   2. Review coordination with related work.

E. Architect will record minutes and distribute copies within five days after meeting to participants, with copies to Owner, Contractor and participants.

1.11 PROJECT COORDINATION MEETINGS

A. Contractor will schedule project coordination meetings to be held weekly.

B. Attendance Required: Contractor, job superintendent, Subcontractors, as required.

C. Contractor will prepare agenda and preside at meeting.

D. Contractor will record minutes and distribute copies within five days after meeting to participants, Architect and those affected by decisions made.

E. Copies of the minutes to Architect are required as part of submission of Application for Payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 4000

QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances.

C. References.

D. Mockup.

E. Inspecting and testing laboratories services.

F. Manufacturers' field services and reports.

G. Field engineering and staking.

1.02 RELATED SECTIONS

A. Section 01 4200- Reference Standards.

B. Section 01 3300 - Submittals: Submission of manufacturers' instructions and certificates.

C. Section 01 4523 - Testing and Inspection Services.

D. Section 01 4525 – Concrete Slab Moisture & pH testing & Treatments.

E. Section 01 6000 - Material, Equipment and Substitutions: Requirements for material and product quality.

F. Section 01 7000 - Contract Closeout.

1.03 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Correct conditions or workmanship not in conformance with specified standards or quality.

C. Comply with manufacturers' instructions, including each step in sequence.

D. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

F. Perform Work by persons qualified to produce required and specified quality.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.04 TOLERANCES

A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.05 REFERENCES

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. The contractual relationships, duties, and responsibilities of the parties in Contract or those of the Architect/Engineer shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 MOCK-UP

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups are representative of the quality required for the Work.

D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.07 TESTING AND INSPECTION AGENCY SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent Testing and Inspection Agency to perform inspecting and testing. Inspections and Testing will be performed in accordance with Section 01 4523 - Testing and Inspection Services; and the General Conditions.

1.08 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship and to initiate instructions when necessary.

1.09 FIELD ENGINEERING AND STAKING

A. Each Contractor awarded Work for this Project shall provide all necessary surveying, layout, lines and grades required for the proper location of the Work.

B. Contractor agrees to provide any and all false-work, templates, batter-boards and other such structures or devices necessary to provide for the Contractor's layout, lines and grades. Work installed in an incorrect location or elevation shall be removed and re-installed at the expense of the Contractor.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 4200

REFERENCE STANDARDS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF REQUIREMENTS

A. General: This section specifies procedural and administrative requirements for compliance with governing regulations and the codes and standards imposed upon the work. These requirements include the obtaining of permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes, and standards.
   1. "Regulations" is defined to include laws, statutes, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the work regardless of whether they are lawfully imposed by governing authority or not.

B. Governing Regulations: Refer to General and Supplementary Conditions for requirements related to compliance with governing regulations.

1.03 DEFINITIONS

A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other contract documents, including the drawings. (Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated thereon.) Certain terms used in contract documents are defined in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to the extent they are not stated more explicitly in another element of contract documents.

B. General Requirements: The provisions or requirements of Division 01 sections apply to entire work of Contract and, where so indicated, to other elements which are included in project.

C. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Architect/Engineer," "requested by "Architect/Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend the Architect's/Engineer's responsibility into the Contractor's area of construction supervision.

E. Approve: Where used in conjunction with Architect's/Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Architect's/Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Architect/Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.

F. Project Site: The term "project site" is defined as the space available to Contractor for performance of the work. The extent of project site is shown on the drawings, and may or may not be identical with the description of land upon which the project is to be built.

G. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

H. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

I. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

J. Installer: The term "installer" is defined as the entity (person or firm) engaged by Contractor, or its subcontractor or subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (installers) be expert in operations they are engaged to perform.

K. Testing Laboratory: The term "testing laboratory" is defined as an independent entity engaged to perform specific inspections or tests of the work, either at project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.

L. Products: The term "products" includes materials, systems and equipment.

M. Approved Equal, Or Equal: means as approved and accepted by the Architect.

N. Shall: The term "shall" is mandatory.

O. As Required, As Necessary, etc.: Words of similar import mean as required by the Contract Documents or essential to the completion of the Work.

P. Concealed: The term "concealed" means as embedded in masonry or other construction, installed within furred spaces, within double partitions or above suspended ceilings, in trenches, in crawl spaces, or in enclosures.

Q. Exposed: The term "exposed" means not installed underground or "concealed" as defined above, including work and surfaces open in whole or in part to the exterior or weather.

R. Work: The term "work" shall include both labor and materials.

S. The Contract Documents:
The Contract Documents consist of the Contract, any addenda thereto, the completed Bid Form, the completed Bond and Insurance forms, the Notice Inviting Bids, the Instructions to Bidders, the General Conditions, the Supplementary General Conditions, the Labor Compliance Program, if any, the Technical Specifications, the Drawings and the Bidder's Questionnaire. All modification(s) amending or extending the work shall be as binding as if originally included in the Contract Documents. A Modification is a written amendment to the Contract signed by both parties, a Change Order, a Construction Change Directive, or a written order for a minor change in the Work issued by the Architect. The Contract Documents are complementary, and each obligation of the Contractor, Subcontractors, material or equipment suppliers in any one shall be binding as if specified in all.

T. The Contract:
The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the Owner and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

U. The Work:
The Work shall include the initial obligation of any Contractor or Subcontractor, who performs any portion of the Work, to visit the Site of the proposed Work, a continuing obligation after the commencement of the Work to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried on under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor or Subcontractor shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated bid documents. The "Site" refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work.

V. The Project:
The Project is the total construction of the Work performed in accordance with the Contract Documents in whole or in part and which may include construction by the Owner or by separate Contractors.

W. The Drawings:

The Drawings are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect.

X. The Specifications:
The Specifications are that portion of the Contact Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

Y. The Project Manual:
The Project Manual is the volume usually assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

1.04 FORMAT AND SPECIFICATION EXPLANATIONS

A. Format Explanation: The format of principal portions of these specifications can be described as in the following paragraphs. Although some portions of these specifications may not be in complete compliance with this format, no particular significance will be attached to such compliance or non-compliance.
   1. Sections and Divisions: For convenience, the basic unit of text is a "section." Each section is identified by a descriptive title (name) and the number. Individual sections are grouped together with other sections of similar or related work groupings known as "divisions." Divisions are recognized as the present industry consensus on uniform specification organization and sequence. The section title is not intended to limit meaning or content of a section, nor to be fully descriptive of the requirements specified therein, nor to be an integral part of the text.
      a. Each section of specifications has been subdivided into 3 "parts" for uniformity and convenience (Part 1-General, Part 2-Products, and Part 3 - Execution); some sections may not require the use of all three parts. These parts do not limit the meaning of and are not an integral part of text which specifies requirements.

B. Subordination of Text: Portions of specification text are subordinated to other portions in the following manner (lowest level to highest):
   1. Indented (from left margin) paragraphs and lines of text are subordinate to preceding text which is not indented, or which is indented by a lesser amount.
   2. Paragraphs and lines of text are subordinate to sub-article titles, which are printed in upper/lower-case lettering.
   3. Sub-articles are the subordinate to article titles, which are printed in uppercase lettering.
   4. Subordination (if any) of certain sections (or portions of sections) to other sections is described within those sections.
   5. Underscoring is used strictly to assist the reader of specification text in scanning text for key words (for quick recall). No emphasis on or relative importance of text is intended where underscoring is used.
   6. Imperative language is used generally in specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by Contractor, or when so noted, by others.

7. Section numbering is used to facilitate cross references in the contract documents. Sections are placed in Project Manual in numeric sequence; however, numbering sequence is not complete, and listing of sections at beginning of Project Manual must be consulted to determine numbers and names of specification sections in contract documents.
8. Page Numbering: Pages are numbered independently for each section and are recorded in the listing of sections (Index or Table of Contents) in Project Manual. The section number is shown together with the page number at the bottom of each page to facilitate the location of text in the Project Manual.
9. Project Identification: Project name (either complete or abbreviated) is recorded at top of each page of specifications to minimize possible misuse of specifications, or confusion with other project specifications.

C. Specification Content: Because of methods by which the project specification has been produced, certain general characteristics of content and conventions in use of language are explained as follows:

1. Specifying Methods: The techniques or methods of specifying to record requirements varies throughout text, and may include "prescriptive," "open generic-descriptive," "compliance with standards," "performance," "proprietary," or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
2. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement is intended and will be enforced, unless specifically detailed language written into the contract documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Architect/Engineer for a decision before proceeding.
3. Contractor's Options: Except for overlapping or conflicting requirements, where more than one set of requirements are specified, for a particular unit of work, option is intended to be Contractor's regardless of whether or not it is specifically indicated as such.

D. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended to be the minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of the requirements. Refer instances of uncertainty to Architect/ Engineer for decision before proceeding.

E. Specialists, Assignments: In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements should not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; they are also not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of entire set of contract requirements remains with the Contractor.

F. Trades: Except as otherwise indicated, the use of titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradespersons of that corresponding generic name.

G. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in the texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in section at first instance of use. Trade association names and titles of general standards are frequently abbreviated.
   1. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.

1.05 DRAWING SYMBOLS

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards," published by John Wiley & Sons, Inc., seventh edition.

B. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/Engineer for clarification before proceeding.

1.06 INDUSTRY STANDARDS

A. General Applicability of Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, applicable standards of the construction industry have the same force and effect (and are made a part of contract documents by reference) as if copied directly into the contract documents, or as if published copies were bound herewith. Refer to other contract documents for resolution of overlapping and conflicting requirements which result from the application of several different industry standards to the same unit of work. Refer to individual unit of work sections for indications of which specialized codes and standard the Contractor must keep at the project site, available for reference.
   1. Referenced standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work. See also Chapter 35 of the CBC.
   2. Non-referenced standards are hereby defined to have no particular applicability to the work, except as general requirements of whether the work complies with standards recognized in the construction industry.

B. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

1. Updated Standards: At the request of the Architect/Engineer, Contractor or governing authority, submit a change order proposal where an applicable industry code or standard has been revised and reissued after the date of the contract documents and before the performance of the work affected. The Architect/Engineer will decide whether to issue the change order to proceed with the updated standard.

C. Copies of Standards: The contract documents require that each entity performing work be experienced in that part of the work being performed. Each entity is also required to be familiar with recognized industry standards applicable to that part of the work. Copies of applicable standards are not bound with the contract documents.
   1. Where copies of standards are needed for proper performance of the work, the Contractor is required to obtain such copies directly from the publication source.
   2. Although certain copies of standards needed for enforcement of the requirements may be required submittals, the Architect/Engineer reserves the right to require the Contractor to submit additional copies of these standards as necessary for enforcement of the requirements.

D. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date as of date of contract documents:

AA	Aluminum Association 1525 Wilson Boulevard, Suite 600, Arlington, VA 22209 www.aluminum.org
AAMA	American Architectural Manufacturers Association 1827 Walden Office Square, Suite 550, Schaumberg, IL 60173-4268 www.aamanet.org; 847.303.5664
AAN	American Association of Nurserymen 1200 G St. Suite 800; Washington, DC 20005 www.anla.org; 202 789 2900
AASHTO	American Association of State Highway & Transportation Officials 444 N. Capitol St.; Washington, DC 20001 www.transportation.org; 202 624 5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215; Research Triangle Park, NC 27709-2215 www.aatcc.org; 919 549 8141
ACA	American Coatings Association 1500 Rhode Island Ave., NW; Washington, DC 20005 www.paint.org; 202-462-6272
ACI	American Concrete Institute

	38800 Country Club Dr., Farmington Hills, MI 48331-3439 www.concrete.org; 313 532-2600
ACIL	American Council of Independent Laboratories 1725 K Street, NW; Washington, DC 20006 www.acil.org; 202 887-5872
ACPA	American Concrete Pipe Association 8445 Freeport Parkway, Suite 350, Irving TX 75063-2595 www.concrete-pipe.org 972 506 7216
AF&PA	American Forest & Paper Association 1111 19th St. NW, Suite 800, Washington, CD 20036 www.afandpa.org
AGA	American Gas Association 400 N. Capitol St. NW, Washington DC 20001 www.aga.org 202 824 7000
AHAM	Association of Home Appliance Manufacturers 1111 19th St. NW, Suite 402, Washington, DC 20036 www.aham.org 202 872 5955
AI	Asphalt Institute 2696 Research Park Drive, Lexington, KY 40511-8480; www.asphaltinstitute.org 859 288 4960
AIA	American Institute of Architects 1735 New York Ave. NW; Washington, DC 20006-5292 www.aia.org 800 242 3837
A.I.A.	American Insurance Association 2101 L Street NW, Suite 400, Washington DC 20037 www.aiadc.org 202 828 7100
AISC	American Institute of Steel Construction One East Wacker Drive, Suite 700, Chicago, IL, 60601-18021 www.aisc.org 312 670 2400
AISI	American Iron and Steel Institute 25 Massachusetts Ave NW Suite 800, Washington, DC 20001 www.steel.org 202 452 7100
AITC	American Institute of Timber Construction www.aitc-glulam.org 503 639 0651
ALSC	American Lumber Standard Committee, Inc. P.O. Box 210; Germantown, MD 20875-0210; www.alsc.org 301 972 1700

ANSI	American National Standards Institute 25 West 43rd St. 4th Floor, New York, NY 10036 www.ansi.org 212 642 4900
APA	American Plywood Association 7011 South 19th, Tacoma, WA 98466; www.apawood.org 253 620 7400
ARI	Air Conditioning, Heating and Refrigeration Institute 2111 Wilson Blvd, Suite 500.; Arlington, VA 22201; www.ahrinet.org 703 524 8800
ASC	Adhesive and Sealant Council 7101 Wisconsin Ave, Ste 990, Bethesda, MD 20814; 301-986-9700 www.ascouncil.org
ASCE/SEI	American Society of Civil Engineers Structural Engineering Institute 1801 Alexander Bell Drive, Reston, VA 20191-4400 www.asce.org; 800 548 2723
ASHRAE	American Society of Heating, Refrigerating & Air Conditioning Engineers 1719 Tullie Circle, NE; Atlanta, GA 30329; www.ashrae.org ; 404 636 8400
ASME	American Society of Mechanical Engineers Three Park Ave, New York, NY 10016-5990 www.asme.org; 800-843-2763
ASPE	American Society of Plumbing Engineers 2980 S. River Road; Des Plaines, IL 60018 www.aspe.org; 847-296-0002
ASSE	American Society of Sanitary Engineers-CA Chapter 1111 W. James Wood Blvd.; Los Angeles, CA 90015 www.asse-plumbing.org; 213-688-9090
ASTM	American Society for Testing and Materials 100 Barr Harbor Dr / PO Box C700, West Conshohocken, PA 19428 www.astm.org; 215 299-5400
AWI	Architectural Woodwork Institute 46179 Westlake Drive;, Ste 120; Potomac Falls, VA 20165 571-323-3636
AWS	American Welding Society 8669 Doral Boulevard, Suite 130, Doral FL 33166 www.aws.org; 800 443 9353

AWPA	American Wood Protection Association P.O. Box 361784; Birmingham AL 35236-1784 www.awpa.com
AWWA	American Water Works Association 6666 W. Quincy Ave., Denver, CO 80235 303-794-7711
BHMA	Builders' Hardware Manufacturers Association 355 Lexington Ave 17th Floor, New York, NY 10017; www.buildershardware.com; 212-297-2122
BIFMA	Business and Institutional Furniture Manufacturer's Association 678 Front Ave NW, Ste. 150; Grand Rapids, MI 49504-5368; 616-285-3963
CBMA	Certified Ballast Manufacturers 2122 Keith Bldg.; Cleveland, OH 44115; 216 241-0711
CDA	Copper Development Association 260 Madison Ave; New York, NY 10016; 212-251-7200
CISPI	Cast Iron Soil Pipe Institute 1064 Dleaware Ave. SW, Atlanta, GA 30316 www.cispi.org; 404 622 0073
CPA	Composite Panel Association 19465 Deerfield Ave. Suite 306, Leesburg, VA 20176 www.compositepanel.org
CPSC	Consumer Product Safety Commission 4330 East West Highway; Bethesda, MD 20814-4408; 301-504-7923
CRI	Carpet and Rug Institute Box 2048/730 College Dr.; Dalton, GA 30720; 706-278-3176
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Rd.; Schaumburg, IL 60173; 847-517-1200
CSA	Canadian Standards Association 5060 Spectrum Way, Mississauga, Ontario, Canada L4W 5N6
CSI	Construction Specifications Institute 110 South Union St., Ste. 100; Alexandria, VA 22314; 800-689-2900 www.csinet.org
CTI	Ceramic Tile Institute 310-574-7800
DHI	Door and Hardware Institute

	14150 Newbrook Drive, Ste. 200; Chantilly, VA 20151-2232 www.dhi.org; 703-222-2010
DLPA	Decorative Laminate Products Association (Formerly National Association of Plastic Fabricators) Hulman Building; 20th Floor; 120 West Second Street; Dayton, OH 45402; 513/228-1041
DOC	US Dept. of Commerce, National Institute of Standards and Technology 1401 Constitution Avenue NW, Washington DC 20230
DOJ	US Department of Justice 950 Pennsylvania Ave. NW Civil Rights Division, Disability Rights Section-NYA Washington DC 20530
DOTn	Department of Transportation 1200 New Jersey Ave, SE; Washington, DC 20402-9325 202 426 4000
EIA	Electronic Industries Association 2001 Eye St., NW: Washington, DC 20006; 202 457-4900
EPA	Environmental Protection Agency 2001 Eye St., NW; Washington DC 20006; www.epa.gov; 202 457 4900
FEMA	Federal Emergency Management Agency, Federal Center Plaza 500 C St. S.W., Washington DC 20472 www.fema.gov
FGMA	Flat Glass Marketing Association White Lakes Professional Bldg; 3310 Harrison; Topeka, KS 66611; 913 266-7013
FM	Factory Mutual Global Research, Standards Laboratory Dept.. 1301 Attwood Ave. POB 7500, Johnson, RI 02919; www.fmglobal.com
GA	Gypsum Association 810 First St. N.E. #510, Washington, DC 20002-4268 www.gypsum.org; 301 277 6886
HMMA	Hollow Metal Manufacturers Association See NAAMM below.

HPVA	Hardwood Plywood Veneer Association 1825 Michael Farraday Dr., Reston, VA 20190 www.hpva.org
HUD	US Dept. of Housing and Urban Development 451 7th St. SW, Washington, DC 20410
IBC	International Building Code 500 New Jersey Ave. NW 6th Floor, Washington, DC 20001 www.iccsafe.org
ICC	International Code Council 500 New Jersey Ave NW, 6th Floor, Washington DC 20001 www.iccsafe.org
IEEE	Institute of Electrical and Electronic Engineers, Inc. 3 Park Ave, 17th Floor; New York, NY 10016 212-419-7900
IES	Illuminating Engineering Society 120 Wall St., Floor 17, New York, NY 10005-4001 212-248-5000
IRI	Industrial Risk Insurers 85 Woodland St.; Hartford, CT 06102; 203/525-2601
ISO	International Organization for Standardization ISO Central Secretariat 1 ch. De la Voie-Creuse, Case Postale 56 CH-1211 Geneva 20, Switzerland www.iso.org
MCAA	Mechanical Contractors Association of America 1385 Piccard Dr.; Rockville, MD 20850; 301-869-5800
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park St. NE; Vienna VA 22180-4602; 703-281-6613
NAAMM	National Association of Architectural Metal Mfrs. 800 Roosevelt Rd. Bldg C, Ste 312; Glen Ellyn, IL 60137 www.naamm.org; 630-942-6591
NBHA	National Builders Hardware Association (No Part of HDI) 711 Old Springhouse Rd.; McLean, VA 22101; 703 556-3990
NBS	National Bureau of Standards (U.S. Dept. of Commerce) Gaithersburg, MD 20234; 301 921-1000

NCMA	National Concrete Masonry Association 13750 Sunrise Valley, Herndon, VA 22071-4662
NECA	National Electrical Contractors Association 3 Bethesda Metro Center, Ste. 1100; Bethesda, MD 20814; 301 657 3110
NEII	National Elevator Industry, Inc. 1677 Country Route 64/PO Box 838; Salem, NY 12865-0838 518-854-3100
NEMA	National Electrical Manufacturers Association 1300 North 17th Street, Ste. 1752, Rosslyn, VA 22209; 703-841-3200
NFPA	National Fire Protection Association 1 Batterymarch Park, Quincy, MA 02169-7471 www.nfpa.org; 617 770 3000
NHLA	National Hardwood Lumber Association P.O. Box 34518; Memphis, TN 38104; 901 377-1818 www.nhla.com
NIST	National Institute of Standards and Technology (US Dept. of Commerce) 1401 Constitution Avenue NW, Washington DC 20230 www.nist.gov
NRCA	National Roofing Contractors Association 10255 W. Higgins Rd., Ste. 600, Rosemont, IL 60018-5607 www.nrca.net; 847-299-9070
NSF	National Sanitation Foundation P.O. Box 130140/789 N. Dixboro Road, Ann Arbor, MI 48113-0140 www.nsf.org 800-673-6275
OSHA	Occupational Safety & Health Administration (U.S. Dept. of Labor) 200 Constitution Ave; Washington, DC 20210 www.osha.gov 800-321-6742
PCI	Precast Prestressed Concrete Institute 209 W. Jackson Blvd., Suite 500, Chicaog, Il 60606-6938 www.pci.org
PDI	Plumbing and Drainage Institute 800 Turnpike Street, Ste. 300; North Andover, MA 01845 www.pdionline.org 978-557-0720
PTI	Post-Tensioning Institute 38800 Coutry Club Dr., Farmington Hills, MI 48331 www.post-tensioning.org

RFCI	Resilient Floor Covering Institute 115 Broad Street, Ste. 201; La Grange, GA 30240 www.rfci.com
RIS	Redwood Inspection Service (Grading Rules) 818 Grayson Rd., Ste. 201; Pleasant Hill, CA 94523 www.redwoodinspection.com 925-935-1499
SDI	Steel Deck Institute POB 25, Fox River Grove, IL 60021 ww.sdi.org
S.D.I.	Steel Door Institute 30200 Detroit Rd.; Westlake, OH 44145 www.steeldoor.org 440-899-0010
SFM	State of California, Dept. of Forestry and Fire Protection Office of the State Fire Marshal, POB 944246, Sacramento, CA 94246 osfm.fire.ca.gov
SGCC	Safety Glazing Certification Council 100 W. Main St. / PO Box 730; Sackets Harbor, NY 13685; 315-646-2234
SJI	Steel Joist Institute 1173B London Links Dr., Forest, VA 24551 steeljoist.org
SMACNA	Sheet Metal & Air Conditioning Contractors' National Association 4201 Lafayette Center Drive;, Chantilly, VA 20151-1219 www.smacna.org 703-803-2980
SPRI	Single-ply Roofing Institute 411 Waverly Oaks Rd., Suite 331B, Waltham, MA 02452 www.spri.org
SSPC	Steel Structure Painting Council (The Society for Protective Coatings) 40 24th Street, 6th Floor, Pittsburgh, PA, 15222-4656 www.sspc.org
TCNA	Tile Council of North America 100 Clemson Research Blvd., Anderson, SC 29625, www.tcnatile.com 864-646-8453
TIA	Telecommunications Industry Association 2500 Wilson Blvd., Ste 300; Arlington VA 22201 www.tiaonline.org 703-907-7700
TMS	The Masonry Society 3970 Broadway, Unit 201-D, Boulder, CO 80304-1135 www.masonrysociety.org

TPI	Truss Plate Institute 218 N. Lee St., Sutie 312, Alexandria, VA 22314 www.tpinst.org
UL	Underwriters Laboratories 333 Pfingsten Rd.; Northbrook, IL 60062-2096 www.ul.com 847 272 8800
ULC	Underwriters Laboratories of Canada 7 Underwriters Rd., Toronto, Ontario, Canada M1R3B4 www.ul.com/Canada/eng/pages/aboutus/
USC	United States Code, c/o Superintendent of Documents US Government Printing Office, Washington, DC 20402-9325
WCLIB	West Coast Lumber Inspection Bureau (Grading Rules) P.O. Box 23145; Portland, OR 97281 www.wclib.org 503 639 0651
WDMA	Window and Door Manufacturers Association 1400 E. Touhy, #470, Des Plaines, IL 60018 www.wdma.com
WI (WIC)	Woodwork Institute PO Box 980247; West Sacramento, CA 95798 www.wicnet.org 916-372-9943
WRI	Wire Reinforcement Institute 942 Main Street; Hartford, CT 06103 www.wirereinforcementinstitute.org
WSC	Water Systems Council 1101 30th Street Northwest; Washington, DC 20007-3708 www.watersystemscouncil.org 888 395 1033
WWPA	Western Wood Products Association (Grading Rules) 522 SW Fifth Ave., Ste. 500; Portland, OR 97204-2122 www.wwpa.org 503 224-3930
W.W.P.A	Woven Wire Products Association www.wovenwire.org

1.07 GOVERNING REGULATIONS/AUTHORITIES

A. General: The procedure followed by Architect/Engineer has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing contract documents; recognizing that such information may or may not be of significance in relation to Contractor's responsibilities for performing the work. Contact governing authorities directly for necessary information and decisions having a bearing on performance of the work.

B. Trade Union Jurisdiction: It is a procedural requirement that the Contractor maintain and require prime subcontractors to maintain, complete current information on jurisdictional matters, regulations actions, and pending actions, as applicable to the work.
   1. Discuss new developments at appropriate project meetings at the earliest feasible dates.
   2. Record information of relevance along with the action agreed upon.
   3. The manner in which contract documents have been organized and subdivided is not intended to be an indication of jurisdictional or trade union agreements.
   4. Assign and subcontract the work, and employ tradesmen and laborers, in a manner which will not unduly risk jurisdictional disputes of a kind which could result in conflicts, delays, claims and losses in the performance of the work.

1.08 SUBMITTALS

A. Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgements, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

DSA 103-16: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS, 2016 CBC

Application Number:	**School Name:**	**School District:**
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

2016 CBC

IMPORTANT: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A. (2016 CBC)

****NOTE:** Undefined section and table references found in this document are from the CBC, or California Building Code.

KEY TO COLUMNS

1. TYPE	2. PERFORMED BY
Continuous – Indicates that a continuous special inspection is required **Periodic** – Indicates that a periodic special inspection is required **Test** – Indicates that a test is required	**GE** – Indicates that the special inspection is to be performed by a registered Geotechnical Engineer (GE) or his or her authorized representative **LOR** – Indicates that the test or inspection is to be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program Laboratory of Record (LOR). See CAC Section 4-335 **PI –** Indicates that the special inspection may be performed by a project inspector when specifically approved by DSA. **SI** – Indicates that the special inspection is to be performed by a Special Inspector (SI)

DSA 103-16: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2016 CBC

Application Number:	School Name:	School District:
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

Geotechnical Reports: Project does NOT have and does NOT require a geotechnical report

	1. GENERAL:	Table 1705A.6		
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**
☑	**a.** Verify that: • Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations. • Foundation excavations are extended to proper depth and have reached proper material. • Materials below footings are adequate to achieve the design bearing capacity.	**See Notes**	**PI**	Refer to specific items identified in the Appendix listing exemptions for limitations. Placement of controlled fill exceeding 12" depth under foundations is not permitted without a geotechnical report.

	2. SOIL COMPACTION AND FILL:	Table 1705A.6		
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**
☐	**a.** Verify use of proper materials, densities and inspect lift thicknesses, placement and compaction during placement of fill.	**Continuous**	**LOR***	* Under the supervision of a geotechnical engineer or LOR's engineering manager. Refer to specific items identified in the Appendix listing exemptions for limitations.
☐	**b.** Compaction testing.	**Test**	**LOR***	* Under the supervision of a geotechnical engineer or LOR's engineering manager. Refer to specific items identified in the Appendix listing exemptions for limitations.

	3. DRIVEN DEEP FOUNDATIONS (PILES):	Table 1705A.7

	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	**a.** Verify pile materials, sizes and lengths comply with the requirements.	**Continuous**	**GE***	* By geotechnical engineer or his or her qualified representative.
☐	**b.** Determine capacities of test piles and conduct additional load tests as required.	**Test**	**LOR***	* Under the supervision of the geotechnical engineer.
☐	**c.** Inspect driving operations and maintain complete and accurate records for each pile.	**Continuous**	**GE***	* By geotechnical engineer or his or her qualified representative.
☐	**d.** Verify locations of piles and their plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and record any pile damage.	**Continuous**	**GE***	* By geotechnical engineer or his or her qualified representative.
☐	**e.** Steel piles.	Provide tests and inspections per STEEL section below.		
☐	**f.** Concrete piles and concrete filled piles.	Provide tests and inspections per CONCRETE section below.		
☐	**g.** For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.	*	*	* As defined on drawings or specifications.

	4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS):	Table 1705A.8		
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**

☐	**a.** Inspect drilling operations and maintain complete and accurate records for each pier.	**Continuous**	**PI**	Continuous inspection to be provided by project inspector. Refer to specific items identified in the Appendix listing exemptions for limitations.
☐	**b.** Verify pier locations, diameters, plumbness and lengths.Record concrete or grout volumes.	**Continuous**	**PI**	Continuous inspection to be provided by project inspector. Refer to specific items identified in the Appendix listing exemptions for limitations.
☐	**c.** Concrete piers.	Provide tests and inspections per CONCRETE section below.		

	5. RETAINING WALLS:			
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**
☐	**a**. Placement of soil reinforcement, drainage devices and backfill.	**Continuous**	**GE***	Placement, compaction and inspection of backfill per Section **1705A.6.1** for fills supporting foundations (Section 2 above). * By geotechnical engineer or his or her qualified representative.
☐	**b.** Segmental retaining walls; inspect placement of units dowels, connectors, etc.	**Continuous**	**GE***	* By geotechnical engineer or his or her qualified representative. See DSA IR 16-3.
☐	**c.** Concrete retaining walls.	Provide tests and inspections per CONCRETE section below.		
☐	**d.** Masonry retaining walls.	Provide tests and inspections per MASONRY section below.		

	6. OTHER SOILS:			
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**

DSA 103-16: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2016 CBC

Application Number:	**School Name:**	**School District:**
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

☐	**a.** Soil Improvements	**Test**	**GE***	Submit a comprehensive report documenting final soil improvements constructed, construction observation and the results of the confirmation testing and analysis to CGS for final acceptance. * By geotechnical engineer or his or her qualified representative.
☐	**b.** Inspection of Soil Improvements	**Continuous**	**GE***	* By geotechnical engineer or his or her qualified representative.
☐	**c.**			

DSA 103-16: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Concrete), 2016 CBC

Application Number:	**School Name:**	**School District:**
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

	7. CAST-IN-PLACE CONCRETE	**Table 1705A.3, ACI 318-14 Sections 26.12 & 26.13**		
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**
Material Verification and Testing:				
☑	**a.** Verify use of required design mix.	**Periodic**	**SI**	**Table 1705A.3 Item 5, 1910A.1** (1909.2.3 for DSA-CC)
☑	**b.** Identifiy, sample, and test reinforcing steel.	**Test**	**LOR**	**1910A.2** (1909.2.4 for DSA-CC); ACI 318-14 Section 26.6.1.2. DSA IR 17-10.16 (See Appendix for exemptions.)
☑	**c.** During concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	**Test**	**LOR**	**Table 1705A.3 Item 6**; ACI 318-14 Sections 26.5 & 26.12
☑	**d.** Test concrete (f'_c).	**Test**	**LOR**	**1905A.1.16** (1909.3.7 for DSA-CC); ACI 318-14 Section 26.12.
Inspection:				
☐	**e.** Batch plant inspection:	**See Notes**	**SI**	Default of **'Continuous'** per **1705A.3.3**; If approved by DSA, batch plant inspection may be reduced to **'Periodic'** subject to requirements in Section **1705A.3.3.1,** or eliminated per **1705A.3.3.2.** (See Appendix for exemptions.)
☐	**f.** Welding of reinforcing steel.	Provide special inspection per STEEL, category 19.1(d) & (e) and/or 19.2(g) & (h) below.		

	8. PRESTRESSED / POST-TENSIONED CONCRETE (in addition to Cast-in-Place Concrete tests and inspections):

	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	**a.** Sample and test prestressing tendons and anchorages.	**Test**	**LOR**	**1705A.3.4, 1910A.3** (1909.2.5 for DSA-CC)
☐	**b.** Inspect placement of prestressing tendons.	**Periodic**	**SI**	**1705A.3.4, Table 1705A.3 Items 1 & 9.**
☐	**c.** Verify in-situ concrete strength prior to stressing of post-tensioning tendons.	**Periodic**	**SI**	**Table 1705A.3 Item 11.** Special inspector to verify specified concrete strength test prior to stressing.
☐	**d.** Inspect application of post-tensioning or prestressing forces and grouting of bonded prestressing tendons.	**Continuous**	**SI**	**1705A.3.4, Table 1705A.3 Item 9;** ACI 318-14 Section 26.13

	9. PRECAST CONCRETE (in addition to Cast-in-Place Concrete tests and inspections):			
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**
☐	**a.** Inspect fabrication of precast concrete members.	**Continuous**	**SI**	ACI 318-14 Section 26.13
☐	**b.** Inspect erection of precast concrete members.	**Periodic**	**SI***	**Table 1705A.3 Item 10;*** May be performed by PI when specifically approved by DSA.

	10. SHOTCRETE (in addition to Cast-in-Place Concrete tests and inspections):			
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**

☐	**a.** Inspect shotcrete placement for proper application techniques.	**Continuous**	**SI**	**1705A.19, Table 1705A.3 Item 7.** See ACI 506.2-13 Section 3.4.
☐	**b.** Sample and test shotcrete (f'_c).	**Test**	**LOR**	**1908A.5, 1908A.10** (1909.4 for DSA-CC)

	11. POST-INSTALLED ANCHORS:			
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**
☐	**a.** Inspect installation of post-installed anchors	**See Notes**	**SI***	**1616A.1.19, Table 1705A.3 Item 4a (Continuous) & 4b (Periodic)** (See Appendix for exemptions). ACI 318-14 Sections 17.8 & 26.13 * May be performed by the project inspector when specifically approved by DSA.
☐	**b.** Test post-installed anchors.	**Test**	**LOR**	**1910A.5** (1909.2.7 for DSA-CC). (See Appendix for exemptions.)

	12. OTHER CONCRETE:			
	Test or Special Inspection	**Type**	**Performed By**	**Code References and Notes**
☐	**a.**			

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

Application Number:	School Name:	School District:
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

Exempt items given in IR A-22 or the 2016 CBC (including DSA amendments) and those items identified below with a check mark by the design professional are NOT subject to DSA requirements for the structural tests **/** special inspections noted. **Items marked as exempt shall be identified on the approved construction documents**. The project inspector shall verify all construction complies with the approved construction documents.

	SOILS:
☐	1. Deep foundations acting as a cantilever footing designed based on minimum allowable pressures per CBC Table 1806A.2 and having no geotechnical report for the following cases: A) free standing sign or scoreboard, B) cell or antenna towers and poles less than 35'-0" tall (e.g., lighting poles, flag poles, poles supporting open mesh fences, etc.), C) single-story structure with dead load less than 5 psf (e.g., open fabric shade structure), or D) covered walkway structure with an apex height less than 10'-0" above adjacent grade.
☑	2. Shallow foundations, etc. are exempt from special inspections and testing by a Geotechnical Engineer for the following cases: A) buildings without a geotechnical report and meeting the exception item #1 criteria in CBC Section 1803A.2 supported by native soil (any excavation depth) or fill soil (not exceeding 12" depth per CBC Section 1804A.6), B) soil scarification/recompaction not exceeding 12" depth, C) native or fill soil supporting exterior non-structural flatwork (e.g., sidewalks, site concrete ramps, site stairs, parking lots, driveways, etc.), D) unpaved landscaping and playground areas, or E) utility trench backfill.

	CONCRETE/MASONRY:
☐	1. Post-installed anchors for the following: A) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment **-** see item 7 for "Welding") given in CBC Section 1616A.1.18 (which replaces ASCE 7-10, Section 13.1.4) or B) interior nonstructural wall partitions meeting criteria listed in exempt item 3 for "Welding."
☑	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section.

☐	3. Non-bearing non-shear masonry walls may be exempt from certain DSA masonry testing and special inspection items as allowed per IR 21-1.16. Refer to construction documents for specific exemptions accordingly for each applicable wall condition.
☐	4. Epoxy shear dowels in site flatwork and/or other non-structural concrete.
☐	5. Testing of reinforcing bars is not required for items given in CBC Section 1910A.2 subject to the requirements and limitations in that section.

	Welding:
☐	1. Solid-clad and open-mesh gates with maximum leaf span or rolling section for rolling gates of 10' and apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
☐	2. Handrails, guardrails, and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds cannot be ground flush.
☐	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
☐	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) 19, 19.1 and/or 19.2 located in the Steel/Aluminum category).
☐	5. Manufactured components (e.g., Tolco, B-Line, Afcon, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 located in the Steel/Aluminum category).

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

Application Number:	School Name:	School District:
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

☐	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 located in the Steel/Aluminum category).
☐	7. Any support for exempt non-structural components given in CBC Section 1616A.1.18 (which replaces ASCE 7-10, Section 13.1.4) meeting the following: A) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) ≤4' above supporting floor/roof, B) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.

DSA 103-16: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS(SIGNATURE), 2016 CBC

Application Number:	**School Name:**	**School District:**
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

Name of Architect or Engineer in general responsible charge:

Name of Structural Engineer (When structural design has been delegated):

Chris S. Warner

Signature of Architect or Structural Engineer:



Date:

07/06/2022

Note: To facilitate DSA electronic mark-ups and identification stamp application, DSA recommends against using secured electronic or digital signatures.

DSA STAMP

DSA 103-16: LIST OF REQUIRED VERIFIED REPORTS, CBC 2016

Application Number:	School Name:	School District:
01-119941	Tennyson High School	Hayward Unified School District
DSA File Number:	**Increment Number:**	**Date Created:**
1-H6	2	2022-07-06 12:14:47

1. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291

SECTION 01 4523

TESTING AND INSPECTION SERVICES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included:
1. Selection and payment of Testing and Inspection Agency
2. Testing and Inspection Agency submittals.
3. Testing and Inspection Agency responsibilities.
4. Testing and Inspection Agency reports.
5. Limits on Testing and Inspection authority.
6. Contractor's Responsibilities.
7. Architect's Responsibilities.

1.02 RELATED SECTIONS

A. Related Sections:
1. Drawings and Contract Documents, including General and Supplemental General Conditions.
2. Section 01 3300 - Submittals: Manufacturer's certificates.
3. Section 01 3200- Construction Progress Schedule.
4. Section 01 4000 - Quality Control.
5. Section 09 0512 - Concrete Floor Moisture Content & pH Testing
6. Section 01 7000 - Contract Closeout: Project Record Documents.
7. Section 01 7500 - Starting of Systems.
8. Technical Specifications - Pertinent Sections requiring tests and inspections.

1.03 REFERENCES

A. ASTM C802 - Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction.

B. ASTM C1021 - Practice for Laboratories Engaged in the Testing of Building Sealants.

C. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

D. ASTM C1093 - Practice for Accreditation of Testing Agencies for Unit Masonry.

E. ASTM D290 - Recommended Practice for Bituminous Mixing Plant Inspection.

F. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

G. ASTM D4561 - Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.

H. ASTM E329 - Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.

I. ASTM E543 - Practice for Determining the Qualification of Nondestructive Testing Agencies.

J. ASTM E548 - Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.

K. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.04 SELECTION AND PAYMENT

A. An independent testing laboratory approved by DSA shall perform inspections, tests, and other services as specified by various specification sections.
   1. Owner will employ and pay for testing laboratory to provide initial testing indicated under specific specification sections and specifically noted to be paid by the Owner.
   2. Contractor shall be back-charged for testing costs when:
      a. Additional tests and inspections by Owner's testing agency where initial tests and inspections reveal failure to meet Contract requirements.
      b. Excessive inspection time by Owner's testing agency is required by Contractor's failure to provide sufficient workman or to properly pursue the progress of work.
      c. Test(s) deemed necessary by the Owner/Architect to evaluate any substitution proposed by the Contractor.
      d. Testing and inspection for the Contractor's convenience.
      e. Testing and inspection overtime necessitated by the Contractor's schedule.

B. Employment of inspection firm in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Employment of any testing laboratory by Contractor shall be subject to Owner approval; laboratory shall be under direct supervision of a registered Engineer and shall conform to ASTM 329. Laboratory of concrete producer shall not be acceptable for concrete mix designs.

D. Owner reserves the right to test any material or work of Project at any time, whether or not tests are indicated in Contract Documents.

1.05 QUALITY ASSURANCE

A. Conform to requirements of the referenced standards.

B. Laboratory: Authorized to operate in State in which Project is located.

C. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.

D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS

A. Prior to start of Work, submit testing laboratory OR inspection firm's name, address, and telephone number, and names of full time registered Engineer and responsible officer.
B. Each Contractor responsible for the construction of a main wind- or seismic-force resisting system, designated seismic or a wind- or seismic-resisting component list in the statement of special inspections shall submit a written statement of responsibility prior to commencement of work on the system or component. A copy of this written statement shall be maintained at the project site and made available upon request. The Contractor's statement of responsibility shall contain the following:
   1. Acknowledgment of awareness of the special requirements contained in the statement of special inspections;
   2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the building official;
   3. Procedures for exercising control within the Contractor's organization, the method and frequency of reporting and the distribution of the reports; and
   4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

C. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.07 AGENCY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

C. Perform specified sampling and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or Products.

F. Perform additional tests required by Architect/Engineer.

G. Attend preconstruction meetings and progress meetings.

1.08 AGENCY AND INSPECTION REPORTS

A. After each test, observation or inspection, promptly submit copies of report to Architect, Engineer, DSA, Owner's Inspector, Owner, Contractor and as otherwise directed.

B. Include:
   1. Date issued.

2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in the Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

C. When requested by Architect/Engineer, provide interpretation of test or inspection results.

1.09 LIMITS ON TESTING and INSPECTION AUTHORITY

A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Agency or laboratory may not approve or accept any portion of the Work.

C. Agency or laboratory may not assume any duties of Contractor.

D. Agency or laboratory has no authority to stop the Work.

1.10 CONTRACTOR RESPONSIBILITIES

A. Provide information regarding activities requiring special inspection and tests to District's inspection and testing laboratory upon request.

B. Provide agency or laboratory representative access to any chosen location and adequate samples of materials proposed to be used which require testing, along with proposed mix designs.

C. Cooperate with laboratory personnel, and provide access to the Work.

D. Provide incidental labor and facilities:
1. To provide access to Work to be tested.
2. To obtain and handle samples at the site or at source of Products to be tested.
3. To facilitate tests.
4. To provide storage and curing of test samples.

E. Notify agency or laboratory and Architect/Engineer forty-eight (48) hours prior to expected time for operations requiring testing services. Become familiar with time constraints of tests required. Schedule work to allow time for performance of required tests.

F. Employ services of an independent qualified testing laboratory and pay for additional samples and tests required by Contractor beyond specified requirements.

1.11 ARCHITECT RESPONSIBILITIES

A. Architect is not responsible for notification of the Testing Agency or scheduling its work.

B. Architect will not be responsible for the actions of the Testing Agency.

1.12 RE-TESTING

A. When initial tests indicate non-compliance with the Contract Documents, subsequent re-testing shall be performed by the same testing laboratory and the costs thereof shall be paid by the Owner and deducted from the Contract Sums owed to the Contractor.

1.13 SCHEDULE OF INSPECTIONS

A. Division of State Architect Form SSS-103 SCHEDULE OF TESTS AND INSPECTIONS is attached.

B. Individual Specification Sections: Other tests or inspections required; standards for testing.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION - NOT USED.

END OF SECTION

DIVISION OF STATE ARCHITECT FORM SSS-103 SCHEDULE OF TESTS AND INSPECTIONS FOLLOWS THIS SECTION

SECTION 01 5000

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 SCOPE

A. Provide all required temporary facilities and controls as shown or specified herein and such additional facilities as required for proper performance of the work.

B. All such temporary facilities shall be located where directed and maintained in a safe and sanitary condition at all times until completion of the contract and then removed from the site for safe disposal.

1.02 TEMPORARY SANITARY FACILITIES

A. Provide adequate temporary sanitary conveniences for the use of all employees and persons engaged on the work including subcontractors and their employees as required by law, ordinances or regulations of public authorities having jurisdiction.

B. Toilet Facilities: Enclosed chemical toilets or water closets and urinals, types acceptable to the Architect, Owner and Authorities Having Jurisdiction.
   1. If fixtures are used, they shall not be incorporated into the building.
   2. Open pit or trench latrines will not be permitted.

C. Permanent plumbing fixtures of the building shall not be used by construction personnel without the written consent of the Owner.

D. Sanitary facilities locations shall be acceptable to the Architect and Owner and shall be maintained in a clean and sanitary condition during the entire course of the work. The Contractor shall keep such facilities adequately supplied with toilet paper, paper toweling, etc. as required.

E. At completion of the work sanitary facilities shall be properly disinfected and all evidence of same removed from the site.

1.03 TEMPORARY ELECTRIC FACILITIES

A. Provide and maintain during the progress of the work all temporary electrical power and wiring requirements to facilitate the work of all trades and services connected with the work. All payment required by the utility company for the cost of their work in providing the service installation shall be paid for by the Contractor.

B. The Owner will permit the operation or use of portions of the permanent electrical system to provide light and power during the construction period.

C. The Contractor shall provide adequate temporary lighting for all work.

1.04 TEMPORARY WATER

A. The Contractor shall make arrangements for all water required for construction purposes. The Contractor shall furnish and install piping or hose to carry water to every point where needed on the project. All water used on the project shall be potable water.

B. The Owner will permit the operation or use of portions of the permanent water system to provide water required for construction purposes during the construction period.

C. Closest availability of water shall be determined by the Contractor.

1.05 CONSTRUCTION EQUIPMENT

A. The Contractor shall erect, equip and maintain all construction equipment in strict accordance with all applicable statutes, laws, ordinances, rules and regulations of the Owner or other authority having jurisdiction. Provide as required for use of all trades. Hoists and scaffolding shall be installed and erected in accordance with the latest Construction Safety Orders issued by the Division of Industrial Safety, State of California and the Associated General Contractor's "Manual of Accident Prevention in Construction," latest edition.

B. Scaffolding, staging, runways and similar equipment required for prosecution of the contract shall be provided and maintained by the Contractor.

C. Hoists and construction elevators required for prosecution of the contract shall be provided and maintained by the Contractor complete with operators, power and signals as required.

D. The Contractor shall provide, maintain and remove upon completion of the work all temporary rigging, scaffolding, hoisting equipment, rubbish chutes, barricades around openings and excavations, ladders between floors, fences and all other temporary work as required for all work hereunder.

E. Temporary work shall conform to all the requirements of state, county and local authorities and underwriters which pertain to operation, safety and fire hazard. The Contractor shall furnish and install all items necessary for conformity with such requirements, whether or not called for under the separate divisions of these specifications.

1.06 FENCES AND BARRICADES

A. Construct and maintain fences, planking, barricades, lights, shoring and warning signs as required by local authorities and state safety ordinances and as required to protect the Owner's property from injury or loss and as necessary for the protection of the public and provide walks around any obstructions made in a public place for carrying on the work covered in this contract. Leave all protection in place and maintain until removal is authorized.

B. Security fencing shall be located such that clear and unobstructed access is maintained to all existing school facilities.

C. Relocate fences and barricades as allowed by the progress of the work to minimize the area enclosed. Avoid unnecessary encroachment on existing facilities.

1.07 PARKING AND EXTERIOR STORAGE

A. The Contractor shall make all arrangements and pay all costs for providing parking facilities for construction personnel, delivery vehicles and authorized visitors.

B. Where space limitations will not permit adequate facilities within the Owner's property, arrangements for off-property facilities shall be made by the Contractor with city or county authorities or other parties having jurisdiction.

C. The Contractor shall make similar arrangements for hardstands or other necessary provision for enclosed storage areas for materials, equipment and debris. Locations and perimeters of such facilities shall be subject to the approval of the Architect and authorities having jurisdiction.

1.08 TEMPORARY FIELD OFFICES

A. Contractor Field Office: Contractor shall provide on the site a temporary field office with a minimum of two individual offices of suitable size for Contractor staff use and for consultations with representatives of the Architect and Owner. Field Office facility shall be:
   1. Weatherproof and secure,
   2. Provided with adequate lighting, heat, cooling and ventilation.
   3. Equipped with a plan rack and plan table, containing a complete set of Contract Documents at all times.
   4. Provide conference table and chairs to seat eight (8) persons with such additional furniture as the Contractor may require.
   5. Provide a temporary telephone, separate line for fax and internet connection with wireless service as hereinafter specified.
   6. Field office location shall be approved by the Architect prior to placing the building on the site.
   7. The Architect and Owner and their representatives shall have free access to the field office at all times.
   8. The field office shall remain the property of the Contractor and shall be removed from the site upon completion of the work.
   9. A suitable office trailer, meeting all foregoing requirements, may be provided for the job office at the Contractor's option.

B. Inspector Field Office: The Contractor shall provide on the site a temporary job office with a minimum of two individual offices of suitable size for the Inspector of Record. Provide the following facilities:
   1. Weatherproof and secure;
   2. Provided with adequate lighting, heat, cooling and ventilation.
   3. Equipped with a plan rack and plan table and shall contain a complete set of Contract Documents at all times.
   4. Sturdy desk with file drawers and chair. The Inspector may provide additional furniture as he or she may require.
   5. Copy Machine as hereinafter specified.
   6. Provide temporary telephone lines, separate line(s) for fax and all handsets, fax terminal equipment and wireless internet connection with wireless service as hereinafter specified.

7. Inspector's field office location shall be approved by the Architect and Inspector prior to placing the building on the site.
8. The Architect and Owner and their representatives shall have free access to the Inspector's field office at all times. Contractor shall not have access to the Inspector's office.
9. The Inspector's field office shall remain the property of the Contractor and shall be removed from the site upon completion of the work. The Inspector will be responsible for removing his or her files and equipment.

C. Owner will not provide office space or furniture for the Contractor's use.

D. Contractor shall relocate field offices as progress of the work may require.

1.09 TEMPORARY TELEPHONE, FAX, internet connection AND OFFICE EQUIPMENT

A. Provide temporary telephone, facsimile (fax) service and internet connection in the temporary field offices for use by the Contractor, Owner, Architect, Inspector and their representatives for purposes related to the work. The telephone, fax and internet connection shall be for the use of representatives mentioned above for local calls without charge to the caller.

B. Fax equipment shall be plain paper type.

C. Provide separate telephone lines, fax lines and internet connection as follows:
1. Contractors Field Office: Two (2) Phone lines; One (1) fax line; one (1) internet connection.
2. Inspector's Field Office: Two (2) Phone lines; One (1) fax line; one (1) internet connection.

D. Inspector's Copy Machine: Provide copy machine service in the temporary Inspector's offices for use by the Owner, Architect, Inspector and their representatives for purposes related to the work. Contractor shall not use Inspector's copy machine.

E. Contractor's Copy Machine: Contractor's Option, provide copy machine service in the temporary Field offices for use by the Contractor.

F. Contractor's Responsibility for Costs: Make all arrangements and pay all costs, including service, maintenance and consumable supplies for the specified equipment, until final acceptance of the project.

1.10 TEMPORARY HEATING, COOLING, VENTILATING

A. Provide temporary heating, cooling, dehumidification and ventilation from an approved source whenever necessary for curing, drying, cooling or warming spaces as may be required for the installation of materials or finishes in specified conditions.

B. Maintain facilities or equipment as required for continuous operation of utilities in service. Do not allow interruption of utilities or services. Supply all fuel of types required.

C. Continue temporary services uninterrupted until permanent building systems are completed, capable of maintaining specified conditions without supplemental equipment, and accepted by the Owner.

1.11 CONTINUITY OF SERVICES

A. Provide temporary panels, raceway, conductors, piping, ductwork and other facilities or equipment as required for continuous operation of utilities in service. Do not allow interruption of utilities.
   1. All utility services, such as water, gas, sewers, electricity, data, cable television, communication, clock, bell, or fire protection system serving the project, or any part of it, shall be maintained in continuous operation at all times for the duration of the contract.
   2. Transfer of utilities function to new systems shall be coordinated in writing with the Owner at least two weeks in advance of the proposed date.
   3. Notify and obtain approval from agencies having jurisdiction over utilities prior to transfer of function.
   4. Coordinate provision and removal of temporary facilities with phasing of construction operations as indicated, or as necessary for continuity of service.

1.12 REMOVAL AT COMPLETION

A. Upon completion of the work, or prior thereto when so directed by the Architect, the Contractor shall remove all temporary facilities, structures and installations from the Owner's property. Similarly, return all exterior areas utilized for temporary facilities to their original natural state or, when called for as part of the Work, complete areas as shown or noted.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01 5600

TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Barriers, enclosures and fencing.

B. Dust control.

C. Water control.

D. Weed control.

E. Protection of Installed Work.

F. Exterior Protection.

G. Tree and Plant Protection.

H. Resource Protection.

G. Progress Cleaning.

1.02 BARRIERS

A. Construct and maintain any necessary fences, barricades and warning signs as required by local authorities and state safety ordinances and as required to protect the Owner's property from injury or loss. Leave all protection in place and maintain until removal is authorized.

B. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

1.03 DUST CONTROL

A. Control dust on the site. Maintain measures to prevent dust and debris from being transported outside the area of Work. Assume responsibility for damage caused by dust to the Work and for damage caused by dust outside the area of Work. Correct damages at Contractor's expense.

B. Refer to Division 2 sections for additional requirements.

1.04 WATER CONTROL

A. Grade site to drain. Provide, operate, and maintain pumping equipment as required to maintain excavations and site construction areas free of water.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Do not permit water to stand in locked-in areas of buildings to receive concrete slabs-on-grade, nor on such slabs following their placement. Provide pumping or dewatering facilities and monitor during storm events to prevent these conditions.

1.05 WEED CONTROL

A. Remove weeds from site that grow over the duration of the project.

B. Prevent incorporation of organic materials into grading or topdressing.

1.06 PROTECTION OF INSTALLED WORK

A. Protect installed Work throughout to maintain undamaged. Provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

D. Prohibit traffic from landscaped areas.

1.07 EXTERIOR PROTECTION

A. Provide temporary weather-tight enclosure of exterior walls for successive areas of building as necessary to:
   1. Allow for progress of work;
   2. Provide acceptable working conditions;
   3. Provide weather protection for materials;
   4. Permit effective heating, cooling, dehumidification or ventilation as circumstances may require;
   5. Prevent entry of unauthorized persons.

B. Bear all costs for replacement of damage to existing or new construction, construction materials and equipment from effects of weather, theft and unauthorized entry.

1.08 TREE AND PLANT PROTECTION

A. Preserve and protect existing trees and plants at site which are designated to remain, and those adjacent to site.

B. Following consultation with Architect, remove roots and branches which interfere with indicated construction.
   1. Employ a qualified tree surgeon to prune and treat cuts.

C. Provide temporary barriers to a height of six feet, around each, or around each group, of trees and plants.

D. Protect root zones of trees and plants:
   1. Do not allow vehicular traffic and parking.
   2. Do not store materials or products.
   3. Prevent dumping of refuse or chemically injurious materials or liquids.
   4. Prevent puddling or continuous running water.

E. Carefully supervise excavating, grading and filling, and subsequent construction operations, to prevent damage.

F. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

1.09 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. Provide on-going, daily housekeeping and cleanup, including all debris boxes or method for disposal of debris. Contractor will not be permitted to leave debris, trash, leavings, dirt, garbage, rubbish, material containers, etc. on the site. No unsafe and un-workmanlike conditions will be permitted.

B. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.10 REMOVAL OF CONTROLS

A. Remove temporary controls prior to inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Procedures for Owner-supplied products.

F. Spare parts and maintenance materials.

1.02 RELATED SECTIONS

A. Document 00 1013 – Notice Inviting Bids: Products designated by Owner as "District Standards."

B. Document 00 2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

C. Document 00 7200 – General Conditions of the Contract: Product options and substitution procedures prior to bid date.

D. Section 01 4000 - Quality Control: Product quality monitoring.

1.03 DEFINITIONS

A. Request For Substitution: Requests for changes in products, materials, or equipment required by Contract Documents proposed by the Contractor prior to and after award of the Contract are considered requests for substitutions. The following are not considered substitutions;
   1. Revisions to Contract Documents requested by the Owner or Architect.
   2. Specified options of products, materials, and equipment included in Contract Documents.

1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's colors, textures, and patterns.

E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances

PART 2 PRODUCTS

2.01 PRODUCTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

B. Provide interchangeable components of the same manufacture for components being replaced.

C. Products or equipment referenced with a manufacturer's name and/or model number shall be provided with all standard materials, components, compliance requirements and features normally furnished for that model or product. These items and requirements are inherent in the specification whether or not individually itemized.

D. Manufacturer's Requirements: Any deviation from design requirements shown or specified, resulting either from Contractor's or supplier's change of model, or manufacturer's recommendation, or from submitted alternates or accepted substitutions, shall be clearly indicated on the Contractor's submittals. Contractor shall provide all such manufacturer or supplier supplemental requirements at no additional cost.

E. Owner's Requirements:
   1. Pursuant to the requirements of California Public Contract Code 3400, the Owner may designate certain products as "District Standards" in order that a field test or experiment may be made to determine the product's suitability for future use, or in order to match other products in use on a particular public improvement, either completed or in the course of construction.
   2. A list of these designated products as may be applicable to the project is contained in the Notice Inviting Bids, as required by PCC 3400. These products shall be provided as specified and are not subject to substitution. All bids shall be deemed to include these listed items as specified without additional costs.
   3. In the event of a conflict between the Notice Inviting Bids and the technical specifications for a product's provision for substitutions, the Notice Inviting Bids shall govern.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming a Single Manufacturer with a Provision for Substitutions: Submit a request for substitution in accordance with specified procedures for products meeting specifications from any manufacturer not named. For such specifications, the Architect is aware of only one manufacturer providing products meeting the specification, pursuant to PCC 3400.

C. Products Specified by Naming Multiple Manufacturers with a Provision for Substitutions: Submit a request for substitution in accordance with specified procedures for products meeting specifications from any manufacturer not named.

D. Products Specified by Naming A Single Manufacturer or Multiple Manufacturers without Provision for Substitution: Use only a product of one of the manufacturers named and meeting specifications. No options or substitutions allowed.

E. Products Specified by Naming A Single Manufacturer or Multiple Manufacturers as listed in the Notice Inviting Bids: Use only a product of one of the manufacturers named and meeting specifications. No options or substitutions allowed

2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.

B. Deliver to Project site, prior to final payment.
   1. Provide materials list for all items turned over to the Owner including quantities.
   2. Deliver items in presence of Owner designated representative to the location identified by the Owner.
   3. Obtain Owner designated representative sign-off of materials list attesting to receipt of items in triplicate. Retain one copy, provide one copy to Owner representative receiving items, and submit one copy to Architect.

PART 3 EXECUTION

3.01 LIMITATIONS ON SUBSTITUTIONS SUBMITTED PRIOR TO THE RECEIPT OF BIDS

A. The Bid shall be based upon the standards of quality established by those items of equipment and/or materials which are indicated in the Contract Documents, including those products designated as "District Standards".

B. Architect may consider requests for substitutions of specified equipment and/or materials only when requests are received by Architect within twenty-one (21) days prior to the date of bid, in conformance with Public Contract Code Section 3400. Do not request substitutions for products designated as "District Standards".

C. Architect will consider a substitution request only if request is made in strict conformance with provisions of this Section. Request shall be fully responsive to all product requirements of the specified product, including those requirements noted in this section in the article titled PRODUCTS.

D. Burden of proof of merit of requested substitution is the responsibility of the proposer requesting the substitution.

E. It is the sole responsibility of the proposer requesting the substitution to establish proper content of submittal for requests for substitutions. Incomplete submittals will be rejected.

F. When substitution is not accepted, provide specified product.

G. Substitute products shall not be included within the bid without written acceptance by Addendum.

3.02 LIMITATIONS ON SUBSTITUTIONS SUBMITTED AFTER THE AWARD OF THE CONTRACT

A. The Contract is based upon the standards of quality established by those items of equipment and/or materials which are indicated in the Contract Documents, including those products designated as "District Standards".

B. Architect will consider substitution requests received after the established date of the receipt of bids or contract award only when one or more of the following conditions are met and documented:
   1. Specified item fails to comply with regulatory requirement.
   2. Specified item is no longer manufactured.
   3. Specified item, through no fault of the Contractor, unavailable in the time frame required to meet project schedule.
   4. Specified item, through subsequent information disclosure, will not perform properly or fit in designated space.
   5. Manufacturer declares specified product to be unsuitable for use intended or refuses to warrant installation of product,
   6. Substitution would be, in the sole judgment of the Architect, a substantial benefit to the Owner in terms of cost, time, energy conservation, or other consideration of merit.

C. Notwithstanding other provisions of this section and the above, the Architect may consider a request for substitution after the date of the receipt of bids or contract award, if in the sole discretion of the Architect, there appears to be just cause for such a request. The acceptance of such a late request does not waive any other specified requirement.

D. Architect will consider a request for substitution after the date of the receipt of bids or contract award only if request is made in strict conformance with provisions of this section. Request shall be fully responsive to all product requirements of the specified product, including those requirements noted in this section in the article titled PRODUCTS.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
   1. Review of shop drawings does not constitute acceptance of substitutions indicated or implied on shop drawings.
   2. Substitutions will not be considered when requested or submitted directly by subcontractor or supplier.

F. Contractor's failure or inability to pursue the work promptly or coordinate activities properly shall not establish a cause for consideration of Substitutions.

G. Burden of proof of merit of requested substitution is the responsibility of the Contractor.

H. It is the sole responsibility of the Contractor to establish proper content of submittal for requests for substitutions. Incomplete submittals will be rejected.

I. When substitution is not accepted, provide specified product.

J. Substitute products shall not be provided without written acceptance by Change Order.

3.03 SUBSTITUTION PROCEDURES

A. Document each request on Architect's Request For Substitution (RFS) form with complete data substantiating compliance of proposed substitution with Contract Documents. All requests for substitution must be submitted on the specified form which may be obtained from the Architect. Requests received without the Request Form will be rejected.

B. A request for substitution constitutes a representation that the proposer:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty or bonds for the substitution as for the specified product.
   3. Will coordinate installation of an accepted substitution and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives all claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse the Owner for services provided by Owner and Architect for review or redesign services associated with re-approval by authorities.

C. Regulatory Requirements: Proposer requesting the substitution shall be responsible for obtaining all regulatory approvals required for proposed substitutions.
   1. All regulatory approval shall be obtained for proposed substitutions prior to submittal of substitution request to Architect, unless Architect participation is required by the regulating agency.
   2. All substitutions that affect structural safety, fire and life safety, access compliance or energy (as applicable) shall be submitted to Division of State Architect for review and approval.
   3. All costs incurred by the Owner in obtaining regulatory approvals for proposed substitutions, including the costs of the Architect and any authority having jurisdiction over the project shall be reimbursed to the Owner. Costs of these services shall be reimbursed regardless of final acceptance or rejection of substitution.

D. Substitution Submittal Procedure:
   1. Submit one original signature copy of only the Request For Substitution Form included in this Project Manual for consideration. Forms provided by proposer or other agencies or organizations are not acceptable. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence, including:
      a. Statement of cause for substitution request.
      b. Identify product by specification section and article number.
      c. manufacturer's name, address, and phone number.
      d. List of fabricators, suppliers, and installers as appropriate.
      e. List of similar Projects where proposed products have been used, date of installation and names of Architect and Owner.
      f. Confirmation of regulatory approvals
      g. Product data, including drawings and product samples.
      h. Fabrication and installation procedures.
      i. Comparison of the qualities of the proposed substitution with that specified.
      j. Cost data comparing the proposed substitution with the product specified.
      k. Any required license fees or royalties.
      l. Availability of maintenance service and source of replacement materials.
      m. Coordination information, including a list of changes or modifications needed to other items of work that will be required to accommodate Proposed substitution.
      n. Statement on the Substitution's effect on the Construction Schedule.
      o. Written certification by the proposer that the Substitution is equal or better in every respect to that required by the contract Documents and that substitution will perform adequately in the application intended.
      p. Written certification that the proposer will pay for all permits, fees, and costs required to implement the substitution, and including waiver of all claims for additional costs or time extension which may subsequently become apparent, and reimbursement of Owner and Architect for review or redesign services associated with re-approval by authorities.

3.04 ARCHITECT'S REVIEW OF SUBSTITUTIONS

A. The Architect will accept or reject proposed substitutions within fourteen (14) days of receipt of request.

B. If a decision on a substitution cannot be made within the time allocated, the product specified shall be used.

C. No extension of bid period or contract time will be made for substitution review.

D. Final acceptance of a substitution submitted prior to the date established for the receipt of bids will be in the form of an Addendum.

E. Final acceptance of a substitution submitted after the award of the contract will be in the form of a Change Order.

F. Architect/Engineer shall be the judge of the acceptability of the proposed substitution. Architect's decision on substitution requests is final and does not require documentation or justification.

G. Rejection Of Substitution Request: Any of the following reasons shall be cause for rejection, all as determined by the Architect;
   1. Vagueness or incompleteness of Substitution submittal,
   2. Insufficient data, failure to meet specified requirements, (including warranty).
   3. Qualification of the requirements of the Substitution Form, including modification of any of the requirements.

H. The Architect/Engineer will notify Contractor in writing of decision to accept, accept as noted, or not accept the request for substitution.

I. Substitute products shall not be ordered or installed without written acceptance.

J. Owner shall receive full benefit of any cost reduction as a result of any request for substitution.

K. Provide submittals for accepted substitutions in accordance with specified requirements of the respective section and provisions of Section 01 2500.
   1. An accepted substitution is not acceptable as a submittal under Section 01 2500. Provide separate submittals for each review.

3.05 OWNER-SUPPLIED PRODUCTS

A. See Section 01 1100- Summary for identification of Owner-supplied products.

B. Owner's Responsibilities:
   1. Arrange and pay for product delivery to site.
   2. On delivery, inspect products jointly with Contractor.
   3. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   4. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:
   1. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   2. Handle, store, install and finish products.
   3. Repair or replace items damaged after receipt.
   4. Coordinate installation with other trades.

3.06 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

3.07 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

I. Provide bonded off-site storage and protection only when site does not permit on-site storage or protection. Obtain Owner's permission prior to initiating such off-site storage.

END OF SECTION

(REQUEST FOR SUBSTITUTION FORM FOLLOWS)

Request for Substitution

{Projects.Name}
Project Number: {Projects.Number}
DSA Application: {LegalDocInfo.NotaryStateOf}
DSA File: {LegalDocInfo.NotaryName}

Specification Title:_____ Product Description:_____

Specification Section:_____ Article/Paragraph:_____

Architect will consider substitution requests received after the date established as deadline for substitution request only when one or more of the following conditions are met and documented; indicate one or more conditions which apply:

☐ Specified item fails to comply with regulatory requirement.
☐ Specified item is no longer manufactured.
☐ Specified item, through no fault of the Contractor, unavailable in the time frame required to meet project schedule.
☐ Specified item, through subsequent information disclosure, will not perform properly or fit in designated space.
☐ Manufacturer declares specified product to be unsuitable for use intended or refuses to warrant installation of product.
☐ Substitution would be a substantial benefit to the Owner in terms of cost, time, energy conservation, or other consideration of merit.
Explain benefit (required): _____

Proposed Product Name (include specific model number):_____

Manufacturer:_____ Phone:_____

Address:_____

Installer:_____

Address:_____ Phone:_____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old

Difference between proposed substitution and specified product:_____

☐ Attached comparative table. Include point-by-point comparison of each article number. **REQUIRED**

Similar Installation:

Project:_____ Architect:_____

Address:_____ Owner:_____

_____ Date Installed:_____

Proposed substitution affects other parts of Work? ☐ No ☐ Yes; Explain:_____

Savings to Owner for accepting substitution:_____ ($_____).

Proposed substitution changes Contract Time? ☐ No ☐ Yes; [Add] or [Deduct]_____ days.

Substitution Request

(Continued)

As outlined in Specification Section 01 6000, a request for substitution constitutes a representation that the proposer:

- ☐ Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
- ☐ Will provide the same warranty or bonds for the substitution as for the specified product.
- ☐ Will coordinate installation of an accepted substitution and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
- ☐ Waives all claims for additional costs or time extension which may subsequently become apparent.
- ☐ Will reimburse Owner for services provided by Owner and Architect associated with re-approval by authorities.

{Company.Name} Representative Printed Name:_____

{Company.Name} Representative Signature:_____

Date Submitted from {Company.Name} to Architect:_____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports

Additional comments:_____

_____

_____

_____

Architect's review and action:

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- ☐ Substitution approved as noted -Make submittals in accordance with Specification Section
- ☐ 01 3300. Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Reviewed by: _____ Date: _____

SECTION 01 6116

VOLATILE ORGANIC COMPOUND (VOC) RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

A. VOC restrictions for product categories listed below under "DEFINITIONS."
   1. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

B. All products of each category that are installed in the project must comply; applicable laws and ordinances do not allow for partial compliance.

C. Listing of a product in these specifications shall not be construed as a solicitation or requirement to use any product or combination of products in violation of the requirements of South Coast Air Quality Management District Rule No.1168, as described in Rule 1168(g).
   1. If a listed product does not meet the requirements of this rule, request approval for use of an alternate product by the same or another manufacturer meeting the requirements of this rule.
   2. Do not use products which do not meet the requirements of this rule.

1.02 RELATED REQUIREMENTS

A. Divisions 01 through 33 contain related requirements specific to the work of each of these Sections. Requirements may or may not include reference to this section.

B. Section 01 8113 “Sustainable Design Requirements”.

1.03 DEFINITIONS

A. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site:
   1. Adhesives, sealants, and sealer coatings, regardless of specification section or division.
   2. Paints and coatings.
   3. Carpet and resilient flooring.
   4. Composite wood products; plywood, particleboard, wood fiberboard.

B. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

C. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.04 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

G. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.05 SUBMITTALS

A. See Section 01 3300 - Submittals Procedures.

B. Evidence of Compliance: Submit for each different product in each applicable category.
   1. Identify evidence submittals with the words "CAL-Green VOC Compliance Report".

C. Product Data: For each VOC-restricted product used in the project, submit product data showing compliance, except when another type of evidence of compliance is required.

D. Installer Certifications for Accessory Materials: Require each installer of any type of product, (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.
   1. Use the form following this section for installer certifications.

1.06 QUALITY ASSURANCE

A. A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168 and less where required by code.
   1. These products may be specified in multiple sections throughout these specifications.

B. Adhesives, including carpet: Comply with Title 24, Part 11, Table 5.504.4.1.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.

C. Joint Sealants: Comply with Title 24, Part 11, Table 5.504.4.2.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.
      c. Certification by manufacturer that product complies with requirements.

D. Aerosol Adhesives: Comply with Title 24, Part 11, Table 5.504.4.1. and California Code of Regulations Title 17, Section 94507.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Current GreenSeal Certification.
      b. Report of laboratory testing performed in accordance with GreenSeal GS-36 requirements.
      c. Published product data showing compliance with requirements.

E. Paints and Coatings: Comply with Title 24, Part 11, Table 5.504.4.3; California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008.
   1. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
      a. Evidence of Compliance: Acceptable types of evidence are:
         1) Report of laboratory testing performed in accordance with requirements.
         2) Published product data showing compliance with requirements.

3) Certification by manufacturer that product complies with requirements.

b. Provide coatings that comply with the most stringent requirements specified in the following:
   1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2) South Coast Air Quality Management District Rule No.1168.

F. Carpet and Carpet Cushion: Per CBC 5.504.4.4, All carpet installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350).
   1. Per CBC 5.504.4.4.1, All carpet cushion installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350).
   2. Per CBC 5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.
   3. See California Department of Public Health's website for certification programs and testing labs. Note, the URL below is published by the California Building Code.

   https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

G. Resilient Flooring Products: Per CBC 5.504.4.6, Where resilient flooring is installed, at least 80 percent of floor area receiving resilient flooring shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350).
   1. See California Department of Public Health's website for certification programs and testing labs. Note, the URL below is published by the California Building Code.

   https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

   2. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

H. Composite Wood Products: Comply with Title 24, Part 11, Table 5.504.4.5 formaldehyde limits for hardwood plywood, particleboard, and medium density fiberboard composite wood products.
   1. Title 24, Part 11, Table 5.504.4.5 Composite Wood Products Maximum Formaldehyde Emissions in Parts per Million.

PRODUCT	CURRENT LIMIT (Effective July 1, 2012)
Hardwood Plywood veneer core	0.05
Hardwood Plywood composite core	0.05
Particleboard	0.09
Medium Density Fiberboard	0.11
Thin Medium Density Fiberboard	0.13

2. Evidence of Compliance: Acceptable types of evidence are:
   a. Chain of custody certifications
   b. Published product data showing compliance with requirements.
   c. Certification by manufacturer that product complies with requirements.
   d. Other method acceptable to enforcing agency.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. All additional costs to restore indoor air quality, including fines by authorities, due to installation of non-compliant products will be borne by Contractor.

3.02 RESTRICTED COMPONENTS

A. Restricted Components:
   1. Paints and coatings shall not contain any of the following:
      a. Acrolein.
      b. Acrylonitrile.
      c. Antimony.
      d. Benzene.
      e. Butyl benzyl phthalate.
      f. Cadmium.
      g. Di (2-ethylhexyl) phthalate.
      h. Di-n-butyl phthalate.
      i. Di-n-octyl phthalate.
      j. 1,2-dichlorobenzene.
      k. Diethyl phthalate.
      l. Dimethyl phthalate.
      m. Ethylbenzene.
      n. Formaldehyde.
      o. Hexavalent chromium.
      p. Isophorone.
      q. Lead.
      r. Mercury.
      s. Methyl ethyl ketone.
      t. Methyl isobutyl ketone.
      u. Methylene chloride.
      v. Naphthalene.
      w. Toluene (methylbenzene).
      x. 1,1,1-trichloroethane.
      y. Vinyl chloride.

B. The following tables are taken from South Coast Air Quality Management District Rule No.1168 and are believed accurate at the time of publication. All products used shall comply with the limits of Rule No. 1168. In the event of discrepancy between these values and those of Rule No. 1168, those of Rule No. 1168 shall prevail.

C. **Table 5.504.4.1 ADHESIVE VOC LIMIT**

Architectural Applications	Current VOC Limit
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesives	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50
Ceramic Tile Adhesives	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50
Cove Base Adhesives	50
Multipurpose Construction Adhesives	70
Structural Glazing Adhesives	100
Single Ply Roof Membrane Adhesives	250

D. Table 5.504.4.1 Continued

	VOC Limits and Effective Dates **	** The specified limits remain in effect unless revised limits are listed in subsequent columns.		
Specialty Applications	Current VOC Limit	1-1-05	7-1-05	1-1-07
PVC Welding	510			
CPVC Welding	490			
ABS Welding	400		325	
Plastic Cement Welding	350	250		
Adhesive Primer for Plastic	650		550	
Computer Diskette Manufacturing	350			
Contact Adhesive	80			
Special Purpose Contact Adhesive	250			
Tire Retread	100			

Adhesive Primer for Traffic Marking Tape	150			
Structural Wood Member Adhesive	140			
Sheet Applied Rubber Lining Operations	850			
Top and Trim Adhesive	540			250

E. Table 5.504.4.1 Continued

For adhesives, adhesive bonding primers, or any other primer not regulated by the above two tables and applied to the following substrates, the following limits shall apply	
Substrate Specific Applications	Current VOC Limit
Metal to Metal	30
Plastic Foams	50
Porous Material (Except Wood)	50
Wood	30
Fiberglass	80

F. Table 5.504.4.2 SEALANT VOC LIMIT

If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.	
Sealant	Current VOC Limit
Architectural	250
Marine Deck	760
Nonmembrane Roof	300
Roadway	250
Single Ply Roof Membrane	450
Other	420

Sealant Primers	Current VOC Limit
Architectural Porous Non-Porous	 250 775
Modified Bituminous	500
Marine Deck	760
Other	750

For low-solid adhesives or sealants the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(32); for all other adhesives and sealants, VOC limits are expressed as grams of VOC per liter of adhesive or sealant less water and less exempt compounds as determined in paragraph (b)(31).	

G. Paints and Coatings: Architectural Paints and Coatings shall comply with VOC limits in Table 1 of ARB Architectural Coatings Suggested Control Measure, California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green" Table 5.504.4.3. All products used in this category shall comply with these limits, unless more stringent local and regional rules apply.

H. **Table 5.504.4.3 VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS (See Notes 2 & 3 below)**

Grams of VOC per Liter of Coating, less water and less exempt compounds.	
COATING CATEGORY	**Current VOC Limit 1/1/2012**
Flat Coatings	50
Nonflat Coatings	100
Nonflat High Gloss Coatings	150
Specialty Coatings	
Aluminum Roof Coatings	400
Basement Specialty Coatings	400
Bituminous Roof Coatings	50
Bituminous Roof Primers	350
Bond Breakers	350
Concrete Curing Compounds	350
Concrete / Masonry Sealers	100
Driveway Sealers	50
Dry Fog Coatings	150
Faux Finishing Coatings	350
Fire Resistive Coatings	350
Floor Coatings	100
Form-Release Compounds	250
Graphic Arts Coatings (Sign Paints)	500
High-Temperature Coatings	420
Industrial Maintenance Coatingss	250
Low Solids Coatings (See Note 1 above)	120
Magnesite Cement Coatings	450
Mastic Texture Coatings	100
Metallic Pigmented Coatings	500
Multicolor Coatings	250
Pretreatment Wash Primers	420
Primers, Sealers and Undercoaters	100

Reactive Penetrating Sealers	350
Recycled Coatings	250
Roof Coatings	50
Rust Preventative Coatings	250
Shellacs: Clear Opaque	 730 550
Specialty Primers, Sealers and Undercoaters	100
Stains	250

Stone Consolidants	450
Swimming Pool Coatings	340
Traffic Marking Coatings	100
Waterproofing Membranes	250
Wood Coatings	275
Wood Preservatives	350
Zinc Rich Primers	340

1. Note 1: Grams of VOC per liter of coating including water and including exempt compounds
2. Note 2: Not Applicable
3. Note 3: Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

END OF SECTION

SECTION 01 6116.01

ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM

1.01 FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Architect: _____

B. Use of This Form:
   1. Because installers are allowed and directed to choose accessory materials suitable for the applicable installation, there is a possibility that such accessory materials might contain VOC content in excess of that permitted, especially where such materials have not been explicitly specified.
   2. Contractor is required to obtain and submit this form from each installer of work on this project.
   3. For each product category listed, circle the correct words in brackets: either [HAS] or [HAS NOT].
   4. If any of these accessory materials has been used, attach to this form product data and MSDS sheet for each such product.

C. VOC content restrictions are specified in Section 01 6116.

2.01 PRODUCT CERTIFICATION

A. I certify that the installation work of my firm on this project:
   1. [HAS] [HAS NOT] required the use of any ADHESIVES.
   2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS.
   3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS.
   4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS.

B. Product data and MSDS sheets are attached.

3.01 CERTIFIED BY: (Installer/Manufacturer/Supplier Firm)

A. Firm Name: _____

B. Print Name: _____

C. Signature: _____

D. Title: _____ (officer of company)

E. Date: _____

END OF SECTION

SECTION 01 7000

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

E. Operation and maintenance data.

F. Spare parts and maintenance Products.

G. Warranties and bonds.

H. Maintenance service.

1.02 RELATED SECTIONS

A. Section 01 5600 - Temporary Controls.

B. Section 01 7500 - Starting of Systems

C. Section 01 2900 - Applications for Payment

1.03 CLOSEOUT PROCEDURES

A. Submit written certification including:
   1. The Work, or a designated portion thereof, is substantially complete in accordance with Contract Documents and ready for Architect/Engineer's review.
   2. A comprehensive list of work which is incomplete or in need of correction.
   3. Draft closeout submittals for the Work, or designated portions thereof.

B. Within a reasonable time after receipt of this certification, the Architect will perform initial review. Incremental review will not be performed.

C. If the Architect determines that the Work is not substantially complete:
   1. The Architect will promptly notify the Contractor and Owner in writing, setting forth reasons for the determination.
   2. The Contractor shall correct or complete deficiencies in the Work and send a second written certification as above.

3. The Architect will perform a subsequent review as above.

D. Coordinate corrective work under provisions of Section 01 3900 - Coordination and Meetings.

E. Upon the Architect's determination that the Work is substantially complete, the Architect will provide to the Contractor a document co-signed by the Owner's Representative indicating remainder of work to be accomplished prior to completion of the project, or contract recognized portion thereof.

1.04 FINAL INSPECTION

A. Submit written certification that:
1. Contract Documents have been reviewed,
2. Work has been inspected, and that
3. Work, or a designated portion thereof, is complete in accordance with Contract Documents and
4. Systems and equipment have been tested in the presence of the Owner.
5. Work is ready for Architect review.

B. Within a reasonable time after receipt of this certification, the Architect will perform a review to verify the status of the Work.

C. If the Architect determines that the Work is not substantially complete, defective or otherwise in need of correction:
1. The Architect will promptly notify the Contractor and Owner in writing, setting forth reasons for the determination and listing the deficient work.
2. The Contractor shall immediately correct or complete deficiencies in the Work and send a second written certification that the Work is complete.
3. The Architect will perform a subsequent review as above.
4. Additional review time by the Architect due to incomplete corrections may be "backcharged" to the Contractor by the Owner.

D. When the Architect determines that the Work is complete in accordance with the Contract Documents, the Architect will request the Contractor to make closeout submittals.

1.05 CLOSEOUT SUBMITTALS

A. Submit under provisions of Section 01 3300 - Submittals.

B. Submittals for review shall be subdivided according to design consultant review.

C. Submittals required by governing or other authorities.

D. Evidence of payment and release of liens under the provisions of Section 01 2900 - Applications for Payment.

E. Certificates of insurance for products and completed operations.

F. Record Drawings

G. Warranties and Bonds.

H. Operations and Maintenance information and manuals.

I. Submit final Application for Payment identifying total adjusted Contract Price, previous payments, and sum remaining due. Adjustments include:
   1. Approved Change Orders.
   2. Unit price calculations.
   3. Allowances.
   4. Liquidated Damages.
   5. Deductions for reinspection.
   6. Deductions for deficient work uncorrected.
   7. Other adjustments.
   8. Approved payments.
   9. Contract Sum as adjusted.
   10. Amount remaining due.

1.06 FINAL CLEANING

A. Execute final cleaning prior to Architect's initial review.

B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned. Remove excess lubrication and other substances.

C. All marks, stains, fingerprints, dust, dirt, splattered paint and blemishes resulting from the various operations shall be removed throughout the Project. Stair treads and risers shall be wet-mopped. Glass shall be left clean and polished both inside and outside. Clean and buff all metalwork. Plumbing fixtures and light fixtures shall be washed clean. Vacuum carpeted and soft surfaces. Exposed concrete, ceramic tile and resilient flooring shall be swept, mopped and waxed (where appropriate) in full compliance with specific requirements of finish manufacturer's specifications. Hardware and other unpainted metals shall be cleaned and all building papers and other temporary protections and labels shall be removed throughout the building, or portion of the building where Contractor was involved, all to the satisfaction of the Architect and District.

D. Contractor shall replace filters and clean heating and ventilating equipment used for temporary heating, cooling and ventilation.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste, surplus materials and rubbish from the site.

1.07 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

G. Submit reproducible documents to Architect prior to final Application for Payment, including indexed PDF(s) of all required documents. Provide one PDF file each for:
1. Complete Record Specifications
2. Complete Record Drawings
3. Complete Record Shop Drawings

H. Receipt and acceptance of Record Documents by the Owner is a precondition for filing Notice of Completion.

1.08 OPERATION AND MAINTENANCE DATA

A. Submit data on 8-1/2 x 11 inch (A4) text pages, bound in three-ring “slant D” binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for [special] finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   g. Receipts for spare parts, maintenance products and keys, attested by the Owner.
3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Originals of warranties and bonds

E. Submit 1 draft copy of completed volumes. This copy will be reviewed and returned with Architect comments. Revise content of all document sets as required prior to final submission.

F. Submit two sets of revised final volumes, within 10 days after final inspection, including indexed PDF(s) of all required documents.

G. Receipt and acceptance of Operations and Maintenance Documents by the Owner is a precondition for filing Notice of Completion.

1.09 WARRANTIES AND BONDS

A. Submit guarantees as specified in the General Conditions.

B. Provide duplicate copies.

C. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

D. Provide Table of Contents and assemble in a three ring binder with durable plastic cover. Also provide indexed PDF of scan of all warranties and bonds.

E. Submit prior to final Application for Payment.

F. In the case that any portion of the work is eligible for a warranty start period prior to Notice of Completion as designated by above article 1.09.F, Contractor shall conform to procedures defined by articles 1.03 through 1.09, applicable to portion of work. Upon the Architect's determination that the Work is substantially complete, the Architect will:
   1. Prepare the Certificate of Substantial Completion upon AIA Form G704 with the Contractor's list of items to be completed or corrected, as verified and amended by the Architect.
   2. Submit the completed Certificate of Substantial Completion to the Contractor and the Owner for written acceptance of their respective duties set forth therein.

G. For items of Work delayed beyond date of Notice of completion or Substantial Completion where applicable, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections during the warranty period.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of each prime Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY:

A. Contractor shall implement procedures to divert **75%** of construction waste. As many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

B. The Contractor shall develop a Waste Management Plan as defined in this Section and submit for review by the Owner, Construction Manager, and Architect.

1.03 DEFINITIONS

A. Waste Materials: construction materials that are excess to the contract requirements and which can not be effectively used in the Work.

B. Salvage Materials: waste materials or materials that exist on the site that can be reused, either on site or by another entity.

C. Recyclable Waste: waste materials that exist on site or are generated during the construction process that can be recycled/remanufactured into another material.

D. Categories of salvageable or recyclable waste include the following:
   1. Concrete, Masonry, and Other Inert Fill Material: concrete, brick, rock, broken up asphalt pavement, clay, and other inert (non-organic) materials.
   2. Metals: metal scrap including iron, steel, copper, brass, and aluminum; includes beverage containers, packaging materials (such as metal banding), fencing, reinforcing bar, wiring, plumbing, etc.
   3. Untreated Wood: unpainted, untreated dimensional lumber, wood edging, wood shipping pallets, etc. Does not include pressure treated or creosote treated wood.
   4. Engineered Wood Products: plywood, oriented strand board, "Masonite", particleboard, manufactured trusses and beams, and glue-laminated timbers.
   5. Gypsum Wallboard: excess drywall construction materials including cuttings, other scrap, and excess materials.
   6. Cardboard: clean, corrugated cardboard such as used for packaging, etc.
   7. Paper Goods:
   8. Office paper: includes any paper, such as manufacturer instruction, specification sheets, files, correspondence, packaging, stiffeners, etc.
   9. Newsprint: shredded or whole newspaper goods.

10. Plastic: beverage containers, packaging materials (such as polystyrene "peanuts" and expanded polystyrene), containers (other than those used for hazardous materials), vinyl products, etc.
11. Glass: includes glass beverage containers, and recyclable glass building materials.
12. Insulation: rigid foam, batt, and loose fill insulation materials.
13. Carpet: face fiber, backing, padding, and carpet cushion scrap.
14. Paints: unused portions of paints and coatings applied on-site.
15. Fabric: uncontaminated fabric scraps.
16. Rubber: uncontaminated rubber scraps, including but not limited to recycled-content rubber flooring, rubber edging, tires that are no longer serviceable, etc.
17. Other: any additional materials identified on-site to be valued for salvage, reuse, or recycling by the Contractor, Owner, Construction Manager, or Architect.

E. Non-Recyclable Waste: All waste materials that are not able to be recycled, due to contamination, lack of recycling facilities or salvage options, or high cost.

F. Source Separated: Materials that are separated on-site by category.

F. Co-Mingled: Several types of construction waste that are combined in a single container. Co-mingling of recycling waste must be approved by the identified recycling facility.

G. Hazardous Waste: Any substance whose handling and/or disposal is regulated as hazardous waste by local, state, or federal authorities.

H. Alternative Daily Cover (ADC): Material placed over a waste collection location or container in order to prevent vector dispersal, fires, odors, or blowing debris, which is then disposed of as waste itself. ADC is not permitted on projects seeking LEED certification.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with all applicable federal, state, and local ordinance and regulation requirements for recycling and waste management.

B. Disposal Sites, Recyclers, and Waste Materials Processors: Use only facilities properly permitted by state and local authorities.

C. Preconstruction Waste Management Conference: Prior to beginning work at the site, schedule and conduct a conference to review the Construction Waste Management Plan and discuss procedures, schedules and specific requirements for waste materials recycling and disposal. Discuss coordination and interface between the Contractor and other construction activities. Identify and resolve problems with compliance with requirements. Record minutes of the meeting, identifying all conclusions reached and matters requiring further resolution.
   1. Plan Revision: Make any revisions to the Construction Waste Management Plan agreed upon during the meeting and incorporate resolutions agreed to be made subsequent to the meeting. Submit the revised plan to the Contracting Officer's Representative for approval.

D. Implementation:

1. Designate an on-site party responsible for instructing workers and implementing the Construction Waste Management Plan.
2. Distribute copies of the Construction Waste Management Plan to the job site foreman and each subcontractor.
3. Include waste management and recycling in worker orientation.
4. Provide on-site instruction on appropriate separation, handling, recycling, and salvaging methods to be used by all parties at the appropriate stages of the work at the site.
5. Prominently display Waste Management Plan and clearly mark all containers and areas on site dedicated to source separation.
6. Include waste management and recycling discussion in pre-fabrication meetings with subcontractors and fabricators.
7. Also include discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of work at the site.

1.05 STORAGE AND HANDLING

A. Salvage Materials: Provide protective handling and storage as required for all items identified for salvage and reuse by the Owner, Construction Manager, or Architect.

B. Recyclable Waste: Remove all recyclable materials, as identified in the Waste Management Plan, from the work location to approved containers daily. Failure to remove waste materials will be considered cause for withholding payment and/or termination of Contract.
   1. Provide separate collection containers as required by recycling haulers and to prevent contamination of material, provide protection from rain as applicable.
   2. Replace loaded containers with empty ones as demand requires but not less than weekly.
   3. If waste will be collected co-mingled in a single container for off-site sorting, facility delivery receipts must show each material stream.
   4.Personal waste (lunch wrappers, etc) must be collected separately from construction waste.

C. Handling: Deposit all indicated recyclable materials in the containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.
   1. If contamination chemically combines with the material so that it cannot be cleaned, do not deposit into the recycle containers.

1.06 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Transport recyclable waste materials from the Work Area to the recycle containers and carefully deposit in the containers in a manner to minimize noise and dust. Close container covers immediately after materials are deposited. Do not place recyclable waste materials on the ground adjacent to a container.

B. Existing Conditions: Coordinate with "Instructions to Bidders" and "Supplementary Conditions".

1.07 SUBMITTALS

A. See Section 01 3329.02 – Sustainable Design Reporting – LEED v4 for LEED Submittal Procedures.

B. Construction Waste Management Plan: Contractor must submit complete Construction Waste Management Plan for review within 30 days from the Notice to Proceed.

C. Updated Construction Waste Management Plan with Delivery Receipts: Submit monthly with Application for Payment as specified in Section 01 2900.

PART 2 PRODUCTS

2. 01 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Construction Waste Management Plan: Contractor shall develop a construction waste management plan indicating proposed methods for collection, segregation, and removal of all construction wastes and debris produced by the work of this Contract, including all costs associated with this plan. Those waste materials produced during the course of this Contract that can be recycled cost-effectively, shall be. The Waste Management Plan shall include, at a minimum, the following:
   1. Provide an analysis of jobsite waste to be generated, including types and quantities.
   2. Provide strategies for salvage, reuse, or recycling for a minimum of all materials listed below. Include additional waste materials that are deemed cost-effective to salvage, reuse, or recycle. See "Definitions" above for material categories.
   3. Provide documentation to justify decision not to recycle any items listed below.
   4. Show compliance with applicable state and local ordinances and regulations.
   5. Include a list of recycling facilities to which indicated recyclable materials will be distributed for disposal.
   6. Identify materials that are not recyclable or otherwise conservable that must be disposed of in a landfill or other means acceptable under governing State and local regulations.
   7. List permitted landfills and/or other disposal means to be employed.
   8. Indicate any instances where compliance with requirements of this Section does not appear to be possible and request resolution from the Architect.

B. Waste Materials: The following materials shall be salvaged or recycled according to this specification. Strategies for salvage and recycling shall be identified in the Waste Management Plan as required above.
   1. Salvage Materials: Identify materials existing on site that are candidates for salvage and reuse, either on this Project or through sale or donation to local organizations.
   2. Recyclable Materials: The following materials, at a minimum, shall be salvaged or recycled. Applies to all such listed waste materials produced during the course of this Contract.
      a. Concrete, Masonry, and Other Inert Fill Material
      b. Metals
      c. Untreated Wood
      d. Gypsum Wallboard Scrap
      e. Cardboard
      f. Paper Goods
      g. Beverage Containers
      h. Plastic
      i. Glass
      j. Carpet

C. Delivery Receipts: Maintain copies of delivery receipts for waste materials salvaged and sent to permitted waste materials processors or recyclers that indicate the location and name of firm accepting recyclable waste materials, types of materials, net weights of each type, date of delivery and value of materials.

D. Maintain working copy of Construction Waste Management Plan at site for review by Owner, Construction Manager, Architect, and all Trades involved in Project.

PART 3 EXECUTION

3. 01 WASTE MANAGEMENT

A. General: Implement waste management procedures in accordance with approved construction waste management plan. Maintain procedure throughout the life of this Contract.

B. Source Separation: Separate, store, protect, and handle at the project site all identified recyclable and salvageable waste products to prevent contamination of materials and maximize recyclability and salvageability of materials.

C. Collection: Arrange for timely pickups from the site or deliveries to approved recycling facilities of designated waste materials to keep construction site clear and prevent contamination of recyclable materials. Maintain records accessible to the Contracting Officer's Representative for verification of construction waste materials recycling.

D. Delivery Receipts: Keep and maintain records of all deliveries to recycling facilities and all pickups of waste materials at the site by others as specified above.

E. Salvage and Reuse: Identify salvage and reuse options for all materials that are deemed to be reusable, but will not be reused on this Project.

F. Non-Recyclable Waste: Collect and segregate non-recyclable waste for delivery to a permitted landfill site.

G. Hazardous Waste: Control and dispose of hazardous waste in accordance with local, state, and federal regulations.

END OF SECTION

SECTION 01 7500

STARTING OF SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Starting of Systems:
   1. New systems in this Contract.
   2. Existing systems relocated or disturbed by the Work of this Contract.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

1.02 RELATED SECTIONS

A. Section 01 4000 - Quality Control: Manufacturers field reports.

B. Section 01 7000 - Contract Closeout: System operation and maintenance data and extra materials.

1.03 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractors' personnel in accordance with manufacturers' instructions.

G. Submit a written report in accordance with Section 01 3300 - Submittals that equipment or system has been properly installed and is functioning correctly.

1.04 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion, including existing telephone, intercom and fire alarm.

B. Demonstrate Project equipment by a qualified manufacturers' representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within four months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at designated location.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 7513

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Execution and installation requirements.

B. Products and installation for patching and extending work.

C. Transition and adjustments.

D. Repair of damaged surfaces, finishes, and cleaning.

E. Existing Systems: Relocation and restoration of function, testing.

1.02 RELATED SECTIONS

A. Section 01 2500 - Submittals: Submittals procedures.

B. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

C. Section 01 5000 - Temporary Facilities and Section 015600 - Temporary Controls: Exterior enclosures, temporary heating/cooling/ventilating facilities.

D. Section 01 7000 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 SUBMITTALS

A. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs as for the project record.

B. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.

1.04 QUALIFICATIONS

A. For survey work employ a land surveyor registered in California and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

1.05 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

E. Erosion and Sediment Control: Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

F. Noise Control: Provide methods, means, and facilities to minimize noise from demoliition, earthwork and noise produced by construction operations.

G. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.06 COORDINATION

A. Coordinate work of alterations and renovations to expedite completion sequentially and to accommodate occupancy requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000.

2.02 FABRICATION

A. Machine-roll components or elements required to be curved or radiused. Do not field bend or "walk-down". Provide true curves minimizing joints, segmented fabrication not allowed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.

B. Verify that demolition is complete in alterations areas and areas are ready for installation of new work.

C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

D. Examine and verify specific conditions described in individual specification sections.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Cut, move, or remove items as necessary for access to alterations and renovation work. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished work.

C. Remove debris and abandoned items from area and from concealed spaces.

D. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity. Insulate ducts and piping to prevent condensation in exposed areas.

E. Prepare surfaces and remove surface finishes to provide for proper installation of new work and finishes.

F. Clean substrate surfaces prior to applying next material or substance.

G. Seal cracks or openings of substrate prior to applying next material or substance.

H. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on Drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.
   4. All other work as indicated or necessary.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install Products as specified in individual sections.

B. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new Work abuts or aligns with existing, perform a smooth and even transition.

C. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

D. Grind or bush split-faced or textured masonry to achieve hairline fit to adjacent trim, flashings, inserts, escutcheons or other penetrating elements.

E. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

F. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

G. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

H. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

I. Re-cover and refinish work that exposes mechanical and electrical work exposed accidentally during the work.

3.05 CUTTING AND PATCHING

A. Execute cutting and patching including excavation and fill to complete the work, to uncover work to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit Products together to integrate with other work.

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

C. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

E. Restore work with new Products in accordance with requirements of Contract Documents.

F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.

H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.06 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

3.07 PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.08 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Division 23 and Sections 01 4000 and 01 7500.

3.09 EXISTING SYSTEMS

A. Examine and test existing building systems and utilities with components requiring relocation during performance of this work. Examples may include but are not limited to:
1. Mechanical Systems
2. Plumbing Systems
3. Electrical Systems, line voltage, low voltage, signal alarm, or data.
4. Fiber-optic data or communication cabling systems.

B. Remove or relocate these components while work is performed.
1. Fiber-optic data cabling systems are extremely fragile and subject to mechanical damage. Relocate these systems with great care. Do not disconnect or remove these systems, which must remain in place and in operation during the Work.

C. Restore these components to the former location upon completion of the Work.

D. Test systems under provisions of Section 01 7500 to confirm proper operation. Conduct tests in the presence of the Architect and Owner's Representative.

E. Perform remedial work as necessary to establish proper operation. Assume responsibility for proper operation of systems following completion of Work.

END OF SECTION

SECTION 01 8113

SUSTAINABLE DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes general requirements and procedures for compliance with California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".
   1. Chapter 5- Non-Residential Mandatory Measures.

1.02 RELATED REQUIREMENTS

A. Pertinent sections specifying erosion control.

B. Section 01 6116 - Volatile Organic Compound (VOC) Restrictions.

C. Section 01 7419 - Construction Waste Management and Disposal.

D. Section 01 7000 – Contract Closeout .

E. Pertinent sections specifying landscape irrigation.

1.03 DEFINITIONS

A. CAL-Green Definitions: Certain terms are defined by CAL-Green in Chapter 5 of the Code. Words and terms used in this section shall have the meanings shown therein.

1.04 INFORMATIONAL SUBMITTALS

A. General: Submit CAL-GREEN submittals required by code and in other Specification Sections.

B. CAL-GREEN submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated CAL-GREEN requirements.

C. Acceptable verification submittals are specified in the related sections.

PART 2 PRODUCTS

2.01 REQUIREMENTS - GENERAL

A. Provide products and procedures necessary to confirm CAL-GREEN compliance required in this Section. Although other Sections may specify some CAL-GREEN requirements, the Contractor shall determine additional materials, techniques, means, methods and procedures necessary to comply with CAL-GREEN requirements.

2.02 STORM WATER POLLUTION PREVENTION PLAN

A. Section 5.106.1: Comply with requirements of this code section, local ordinances, General Conditions, Special Provisions, and related sections specifying erosion control.

2.03 OUTDOOR WATER USE

A. Section 5.304.3.1: Irrigation Controllers: Comply with requirements of this code section, local ordinances and Section 32 8000.

2.04 CONSTRUCTION WASTE REDUCTION

A. Section 5.408 Construction Waste Management, Diversion and Recycling: Comply with requirements of this code section, local ordinances and Section 01 7419.

2.05 BUILDING MAINTENANCE AND OPERATION

A. Section 5.410.2.3, 4. Commissioning and Functional Performance Testing: Participate in Commissioning and provide functional performance testing as required by these code sections and as specified in Section 01 7500.

B. Section 5.410.2.5. Documentation and Training: Provide Operations Training as required by these code sections and as specified in Section 01 7500 and Systems Manual as specified in Section 01 7500.

2.06 POLLUTANT CONTROL

A. Section 5.504.3 Indoor Air Quality: Comply with requirements of this code section, local ordinances.
   1. During storage, rough installation and until final start-up of HVAC equipment, securely cover all ducts and air distribution component openings with plastic, tape, sheet metal or other methods acceptable to enforcing agency to reduce dust or debris collected in the system.

B. Section 5.504.4 Finish Material Pollutant Control: All Finish materials shall comply with requirements of this code section, local ordinances and Section 01 6116.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with Section 01 7419 - Construction Waste Management and Disposal.

B. Comply with execution requirements of related sections and applicable local codes and ordinances.

END OF SECTION

SECTION 02 4119
MINOR DEMOLITION FOR REMODELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Remove existing work as indicated and as necessary to permit new work.

1. Removal of designated building equipment and fixtures.

2. Removal of designated construction.

B. Disposal of materials.

C. Identification of utilities.

D. Salvaging, storing, and protecting existing work to remain or to be removed and re-installed.

1.02 RELATED REQUIREMENTS

A. Section 01 1100 - Summary: Work sequence and continued occupancy of the building.

B. Section 01 5000 - Temporary Facilities and Controls: Temporary enclosures, dust control barricades, security at occupied areas, and cleanup during construction.

C. Section 01 7419 - Construction Waste Management.

D. Section 01 7513 - Execution Requirements: Re-installation of removed components.

1.03 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

B. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, “CAL-Green”.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped utilities.

1.05 REGULATORY REQUIREMENTS

A. Conform to Title 24, CBC code for demolition work, dust control, products requiring electrical disconnection and re-connection .

B. Do not close or obstruct egress from any building exit or site exit.

C. Do not disable or disrupt building fire or life safety systems without 10 (ten) days prior written notice to Owner.

D. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

1.06 SEQUENCING

A. Sequence work under the provisions of Section 01 1100.

1.07 SCHEDULING

A. Schedule work under the provisions of Section 01 3200.

B. Schedule work to coincide with new construction.

C. Coordinate demolition with other trades to assure the proper sequence, limits, methods and time of performance. Schedule work so as to impose a minimum of hardship on the present operation of facilities and the performance of the work of other trades or contracts.

D. Describe demolition and removal procedures in the Project schedule.

E. Perform noisy, malodorous, or dusty work during hours described below. Conform to more stringent requirements of local authorities having jurisdiction, when applicable:

1. Between the hours of 7:00 am and 5:00 pm.

1.08 PROJECT CONDITIONS

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Use all means necessary to protect existing objects, construction and plantings designated to remain. In the event of damage, make all repairs and replacements necessary for approval of Architect at no additional cost to the Owner.

C. Protective measures: Provide all necessary safeguards, including warning signs and lights, barricades, and the like, for protection of the public, Contractor's employees and existing improvements during demolition. Prevent access of unauthorized persons to area of work

D. Provide at least one person who shall be present at all times during execution of this portion of the work, be thoroughly familiar with the type of work being performed and the best methods for its execution and who shall direct all work performed under this Section.

E. Control the use of water to prevent damage to the existing facilities to remain. Provide wet vacuum equipment where water, such as waste cooling water from concrete sawing or water used as dust emollient, is used adjacent to and in existing buildings.

F. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

PART 3 EXECUTION

3.01 PREPARATION

A. Provide, erect, and maintain temporary barriers at locations indicated.

B. Inspect the area of work and verify locations of all items designated to be removed or preserved.

C. Do not begin demolition work until temporary barricades, warning signs and other forms of protection are installed.

D. Erect and maintain weatherproof closures for exterior openings.

E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued occupancy of adjacent buildings.

F. Protect existing materials and features that are not to be demolished.

G. Prevent movement of structure; provide bracing and shoring.

1. Be responsible for the adequacy and design of all temporary shoring and bracing systems.

H. Notify affected utility companies before starting work and comply with their requirements.

I. Mark location and termination of utilities.

J. Provide appropriate temporary signage including signage for exit or building egress.

3.02 DEMOLITION

A. Disconnect, remove, and identify designated utilities within demolition areas.

B. Demolish in an orderly and careful manner. Protect existing supporting structural members and features indicated to remain.

1. Cut openings in existing walls or roofs at locations necessary to accommodate new doors, windows, ductwork, piping, conduits, raceways or other building services or elements.

2. Demolish concrete curbs at locations of walls to be removed.

3. Remove dry-rotted wood materials and other unsuitable materials as indicated and as required to provide sound substrates for other work.

4. Use of explosives will not be permitted.

C. Remove existing flooring, wall coverings, trim or other finishes in areas designated to receive new work.

D. Remove existing construction only to the extent necessary for the proper installation of new construction and junction with existing work. Cut back finished surfaces to straight, plumb or level lines as required.

E. Mechanical, Plumbing and Electrical systems : Demolish existing improvements as required to permit installation of new systems indicated. Refer to pertinent sections of Divisions 22, 23 and 26 for

additional specific demolition required for mechanical, plumbing and electrical systems.

F. Securely seal exposed ends of existing ductwork systems left open by demolition operations. Prevent entry of foreign matter. Protect these seals from damage until connected to new work.

G. Remove all fasteners, anchors, supports and similar appurtenances from substrates indicated to remain. Leave substrates in good condition to receive new work.

1. Pull nails from wood framing. Unthread screws, do not pull out. Do not drive existing nails or screws flush.

2. Remove suspended ceiling support wires.

3. Remove staples, screws, and miscellaneous anchors from all gypsum board, wood paneling, masonry wall surfaces indicated to remain.

H. Demolish as follows:

1. Portland cement concrete, asphalt concrete paving: Saw cut or core drill; jack-hammering of central areas away from saw-cut joint is acceptable for removing large areas of concrete. Cut back concrete or paving to clean, straight saw-cut lines. Provide wet vacuum equipment as required for control of waste cooling water.

2. Modular materials such as ceiling, resilient and ceramic tile: Remove to a natural point of division in whole units to a joint line with no damaged or defective unit remaining to adjoin new construction.

3. Gypsum wallboard: Remove to a joint line on a support.

4. Wood trim: Remove to a natural existing joint line.

I. Examine substrates and surfaces exposed by demolition for water damage, dryrot, decay, termite infestation or other structural failure. Request direction from the Architect if these conditions are discovered. Additional demolition beyond scope originally indicated may be required to fully remove damaged or unsuitable materials.

J. Work not mentioned to be removed that interferes with new construction shall be cut to clean cut lines to provide for proper interface with new construction, or patching and repair, as required.

K. All holes or trenches created by removal of underground piping or other facilities demolished shall be filled with clean soil and compacted to the density for fills specified. Do not backfill if subsequent excavation will occur at the same location. Do not backfill hole or trenches until inspected by the Soils Engineer or IOR.

L. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

M. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.

N. Remove temporary facilities.

3.03 SALVAGE

A. Items indicated to be salvaged shall be removed carefully, cleaned and stored in a protected location on or off the site until re installed; salvaged items to be deliverd to the Owner shall also be removed carefully and presented to the Owner's designated representative.

B. Owner may take possession of any items of salvage for his use if he desires. Provide incidental labor to relocate designated salvage for Owner's storage.

3.04 PATCHING

A. Patch materials to remain when damaged by this work. Finish materials and appearance of the patch or repair work shall match the existing contiguous materials and finishes in all respects and shall be approved by Architect.

B. Where openings are cut oversize or in improper location, replace the excess removed material as instructed by Architect at no additional cost to the Owner.

3.05 CLEAN-UP AND DISPOSAL

A. Debris, waste, and removed materials, other than items to be salvaged, are Contractor's property for legal disposal off the site, as required by applicable Federal and State regulations. Continuously clean up and remove these items. Do not allow demolished items to accumulate. All materials to be disposed, shall meet the requirements of the Construction Waste Management program.

B. Leave the site in a neat and orderly condition prepared for the work of other trades.

END OF SECTION

SECTION 03 0100
MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.01 Section Includes

A. Cleaning of existing concrete surfaces.

B. Repair of exposed structural, shrinkage, and settlement cracks.

C. Resurfacing of concrete surfaces having spalled areas and other damage.

D. Replacement of concrete floor slab over new utility installations

E. Repair of deteriorated concrete.

F. Scope of Work: As indicated on drawings.

1.02 Related Requirements

A. Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

B. Pertinent Sections specifying Volatile Organic Compound (VOC) Restrictions

1.03 Reference Standards

A. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

B. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

C. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.04 Administrative Requirements

1.05 Submittals

A. Submit in Accordance with Section 01 3300

B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

C. Manufacturer's qualification statement.

D. Cleaner's qualification statement.

E. Installer's qualification statement.

1.06 Quality Assurance

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Cleaner Qualifications: Company specializing in, and with minimum of 3 years of experience in, the type of cleaning specified.

C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum of 3 years of documented experience.

1.07 Mock-Ups

A. Test each type of maintenance procedure required on each type of existing construction, to determine the most appropriate procedures to use and as a record of expected results.

B. Crack Injection: Prepare one sample of each type of injection.

C. Horizontal Surface Repair: Total of 10 foot square area, demonstrating each type of repair.

D. Vertical Surface Repair: Total of 10 foot square area, demonstrating each type of repair.

E. Where color or texture matching is required, first prepare a small size sample on cementitious board.

F. Locate mock-up(s) where directed.

G. Re-work mock-up(s) until satisfactory to Architect.

H. Satisfactory mock-up(s) may remain as part of the work.

1.08 Delivery, Storage, and Handling

A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

PART 2 PRODUCTS

2.01 Cleaning Materials

A. Degreaser:

1. Manufacturers:

a. Euclid Chemical Company; Euco Clean and Strip: www.euclidchemical.com/#sle.

b. LATICRETE International, Inc; CITREX: www.laticrete.com/#sle.

c. Nox-Crete, Inc; Bio-Clean Plus: www.nox-crete.com/#sle.

d. SpecChem, LLC; Orange Peel-Citrus Cleaner: www.specchemllc.com/#sle.

e. W. R. Meadows, Inc; _____: www.wrmeadows.com/#sle.

f. Substitutions: See Section 01 6000 - Product Requirements.

B. Detergent: Non-ionic detergent.

2.02 Cementitious Patching and Repair Materials

A. Bonding Slurry: Water-based latex admixture; comply with ASTM C1059/C1059M, combined with Portland cement and sand in accordance with admixture manufacturer's instructions.

1. Admixture Manufacturers:

a. Euclid Chemical Company; AKKRO-7T: www.euclidchemical.com/#sle.

b. Mapei Corporation; Planibond 3C: www.mapei.com/#sle.

c. SpecChem, LLC; Strong Bond - Acrylic Bonder: www.specchemllc.com/#sle.

d. W. R. Meadows, Inc; Acry-lok: www.wrmeadows.com/#sle.

e. Substitutions: See Section 01 6000 - Product Requirements.

B. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.

1. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.

2. Recommended Thickness: Feather edge to 1/8 inch.

3. Color: Gray.

4. Manufacturers:

a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.

b. Euclid Chemical Company; THIN TOP SUPREME: www.euclidchemical.com/#sle.

c. Xypex Chemical Corporation; Xypex Megamix II: www.xypex.com/#sle.

d. Substitutions: See Section 01 6000 - Product Requirements.

C. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.

1. In-place material resistant to freeze/thaw conditions.

2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.

3. Manufacturers:

a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.

b. Euclid Chemical Company; EXPRESS REPAIR: www.euclidchemical.com/#sle.

c. Euclid Chemical Company; EucoRepair V100: www.euclidchemical.com/#sle.

d. W. R. Meadows, Inc; Meadow-Patch T1, Meadow-Patch T2, Meadow-Patch 5, or Meadow-Patch 20: www.wrmeadows.com/#sle.

e. Substitutions: See Section 01 6000 - Product Requirements.

D. Cementitious Repair Mortar, Form and Pour/Pump Grade: Flowable, one- or two-component, factory-mixed, polymer-modified cementitious mortar; in-place material resistant to freezing conditions.

1. Mixed with water in proportions as recommended by manufacturer.

2. Integral corrosion inhibitor.

3. Manufacturers:

a. Euclid Chemical Company; EUCOCRETE SUPREME: www.euclidchemical.com/#sle.

b. W. R. Meadows, Inc; Meadow-Crete FNP: www.wrmeadows.com/#sle.

c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 Epoxy Patching and Repair Materials

A. Epoxy Injection Adhesive:

1. Manufacturers:

a. Euclid Chemical Company; DURAL FAST SET LV: www.euclidchemical.com/#sle.

b. W. R. Meadows, Inc; Rezi-Weld LV, Rezi-Weld LV State, Rezi-Weld (IP), or Rezi-Weld Gel Paste: www.wrmeadows.com/#sle.

c. Substitutions: See Section 01 6000 - Product Requirements.

B. Epoxy Bonding Adhesive: Non-sag, two-component, 100 percent solids; recommended by manufacturer for purpose and conditions under which used.

1. Non-Load-Bearing Applications: ASTM C881/C881M, Type I, II, III, IV, or V, whichever is appropriate to application.

2. Manufacturers:

a. ARDEX Engineered Cements; ARDEX BACA: www.ardexamericas.com/#sle.

b. Euclid Chemical Company; DURALFLEX LV: www.euclidchemical.com/#sle.

c. W. R. Meadows, Inc; Rezi-Weld Gel Paste: www.wrmeadows.com/#sle.

d. W. R. Meadows, Inc; Rezi-Weld Gel Paste State: www.wrmeadows.com/#sle.

e. W. R. Meadows, Inc; Rezi-Weld 1000: www.wrmeadows.com/#sle.

f. Substitutions: See Section 01 6000 - Product Requirements.

2.04 Accessories

A. Water: Clean and potable.

PART 3 EXECUTION

3.01 Examination

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.02 Preparation

A. Prepare concrete surfaces to be repaired according to ICRI 310.2R, _____.

3.03 Cleaning Existing Concrete

A. Provide enclosures, barricades, and other temporary construction as required to protect adjacent work from damage.

B. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.

1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.

2. Clean out cracks and voids using same methods.

C. The following are acceptable cleaning methods, in order from gentlest to less gentle:

1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.

2. Increasing the water washing pressure to maximum of 400 psi.

3. Adding detergent to washing water; with final water rinse to remove residual detergent.

4. Steam-generated low-pressure hot-water washing.

D. Do not use any of the following cleaning methods, unless otherwise indicated:

1. Brushes with wire bristles, grinding with abrasives, solvents, hydrochloric or muriatic acid, sodium hydroxide, caustic soda, or lye.

2. Soap or detergent that is not non-ionic.

3. Abrasive blasting.

3.04 Crack Repair Using Epoxy Adhesive Injection

A. Repair exposed cracks.

B. Follow epoxy adhesive manufacturer's written installation instructions.

C. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than the depth of the crack to be filled or port size diameter no greater than the thickness of the crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.

D. Inject adhesive into ports under pressure using equipment appropriate for particular application.

E. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port. Continue from port to port until entire crack is filled.

F. Remove temporary seal and excess adhesive.

G. Clean surfaces adjacent to repair and blend finish.

3.05 Concrete Surface Repair Using Cementitious Materials

A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.

B. Follow bonding agent and repair mortar manufacturer's written installation instructions.

C. Apply coating of bonding agent to entire concrete surface to be repaired.

D. Fill voids with cementitious mortar flush with surface.

E. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch over entire surface, terminating at a vertical change in plane on all sides.

F. Trowel finish to match adjacent concrete surfaces.

G. Damp cure for four days.

3.06 FLOOR SLAB REPAIR FOLLOWING BELOW GRADE UTILITY INSTALLATION

A. Verify Utility installation is complete with backfill installed and compacted to subgrade elevation matching existing adjactent conditions.

B. Clean concrete surfaces of dirt, laitance, corrosion and other contamination, using methods specified above and allow to dry

C. Follow bonding agent and repair mortar manufacturer's written installation instructions. Apply bondin

D. Provide concrete mix to depth of existing adjacent slab as detailed

E. Trowel finish to match adjacent concrete surfaces

F. Damp cure for seven (7) days

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 Section Includes

A. Concrete formwork.

B. Floors and slabs on grade.

C. Concrete reinforcement.

D. Joint devices associated with concrete work.

E. Concrete curing.

F. Coordination with other sections:

1. Make all preparations and do all work necessary to receive or adjoin other work. Install all bolts and anchors, including those furnished by other sections, into formwork and provide all required blocking

2. Install all accessories embedded in the concrete and provide all holes, blockouts and similar provisions necessary for the work of other sections. Provide all patching or cutting made necessary by failure or delay in complying with this requirement at the Contractor's expense.

3. Coordinate with other sections for the accurate location of embedded accessories.

1.02 Related Requirements

A. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.

B. Pertinent Sections of Division 03 specifying concrete consturction

C. Pertinent Sections of other Divisions specifying work to be embedded in concrete work or penetrating concrete

D. Pertinent sections of other Divisions specifying floor finishes and sealants applied to concrete substrates.

E. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 Reference Standards

A. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.

B. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary.

C. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.

D. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction.

E. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

F. ACI PRC-305 - Guide to Hot Weather Concreting.

G. ACI PRC-306 - Guide to Cold Weather Concreting.

H. ACI PRC-308 - Guide to External Curing of Concrete.

I. ACI PRC-347 - Guide to Formwork for Concrete.

J. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials.

K. ACI SPEC-301 - Specifications for Concrete Construction.

L. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

M. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

N. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

O. ASTM C150/C150M - Standard Specification for Portland Cement.

P. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete.

Q. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.

R. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

S. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

T. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

U. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids.

V. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.04 Submittals

A. See Section 01 3300 for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

2. For chemical-resistant waterstops, provide data on ASTM D471 test results.

3. For membrane-forming, moisture emission-reducing, curing and sealing compound, provide manufacturer's installation instructions,.

C. Mix Design: Submit proposed concrete mix design.

1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.

2. Indicate proposed mix design complies with requirements of ACI CODE-318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Samples: Submit samples of underslab vapor retarder to be used.

E. Test Reports: Submit report for each test or series of tests specified.

F. Test Reports: Submit termite-resistant sheet manufacturer's summary of independent laboratory and field testing for effectiveness in subterranean termite exclusion.

G. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

H. Sustainable Design Submittals: If any wood or wood-based form materials, including supports, are permanently installed in the project, submit documentation required for sustainably harvested wood as specified in Section 01 6000 - Product Requirements.

I. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

J. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

K. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 Quality Assurance

A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

B. Follow recommendations of ACI PRC-305 when concreting during hot weather.

C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

D. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

E. For slabs indicated to receive membrane-forming, moisture emission-reducing, curing and sealing compound, do not proceed with application unless manufacturer's representative is present for every day of placement.

1.06 Warranty

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Slabs with Porosity Inhibiting Admixture (PIA) or Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.

1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.

C. Moisture Emission-Reducing Curing and Sealing Compound, Penetrating: Provide non-prorated warranty to cover cost of flooring delamination failures for 20 years.

1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

D. Termite-Resistant Vapor Barrier Sheet: Provide five year manufacturer's limited warranty.

PART 2 PRODUCTS

2.01 Formwork

A. Formwork Design and Construction: Comply with guidelines of ACI PRC-347 to provide formwork that will produce concrete complying with tolerances of ACI SPEC-117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

1. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

2. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 Reinforcement Materials

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

4. Coupler Systems: Mechanical devices for splicing reinforcing bars; capable of developing full steel reinforcing design strength in tension and compression.

2.03 Concrete Materials

A. Cement: ASTM C150/C150M, Type II - Moderate Portland type. low alkali

B. Fine and Coarse Aggregates: ASTM C33/C33M.

C. Lightweight Aggregate: ASTM C330/C330M.

D. Fly Ash: ASTM C618, Class F.

E. Slag Cement: ASTM C989, Grade 100 or 120

F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 Admixtures

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

1. Products:

a. Master Builders Solutions, MasterGlenium Series: www.master-builders-solutions.com/en-us/#sle.

b. Substitutions: See Section 01 6000 - Product Requirements.

C. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D or B

1. Products:

a. Master Builders Solutions; MasterSet DELVO: www.master-builders-solutions.com/en-us/#sle.

b. Master Builders Solutions: Master Set R series

c. Nox-Crete 'Plastiflow-R

d. Substitutions: See Section 01 6000 - Product Requirements.

D. Water Reducing Admixture: ASTM C494/C494M Type A.

1. Products:

a. Master Builders Solutions; MasterPozzolith Series: www.master-builders-solutions.com/en-us/#sle.

b. W.R. Grace WRDA series

c. Substitutions: See Section 01 6000 - Product Requirements.

E. Workability-Retaining Admixture: For on-site production of concrete with Type S cement in accordance with ASTM C494/C494M.

2.05 Accessory Materials

A. Underslab Vapor Retarder:

1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

B. Self-Leveling Cementitious Concrete Floor Topping:

2.06 Bonding and Jointing Products

A. Epoxy Bonding System:

1. Complying with ASTM C881/C881M and of Type required for specific application.

2. Products:

a. W. R. Meadows, Inc; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000: www.wrmeadows.com/#sle.

b. Substitutions: See Section 01 6000 - Product Requirements.

2.07 Curing Materials

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

2.08 Concrete Mix Design

A. Special mix design requirements for interior concrete floor slabs on ground:

1. Comply with ACI PRC-211.1 recommendations.

2. Fly Ash shall be substituted for cement on a 1 lb. per 1 lb. bais, with a minimum replacement of 25% and a maximum of 35%.

3. 200 lbs of 3/8(-) aggregate shall be added to reduce total sand

4. Reduce total sand to minimum practical

5. Admixture dosage shall be per manufacturer's recommendations. Dosage may be increased for workability as long as set times are not excessive for placement and finishing.

2.09 Mixing

A. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 Examination

3.02 Installing Reinforcement and Other Embedded Items

A. Comply with requirements of ACI SPEC-301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.03 Placing Concrete

A. Place concrete in accordance with ACI PRC-304.

3.04 Concrete Finishing

3.05 Curing and Protection

A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.06 Defective Concrete

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. All miscellaneous metal fabrications not classified as structural steel.

B. Iron and steel fabrications for wood or metal framing, including bracing.

C. Inserts and anchorages: Furnish only, inserts and anchoring devices for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work.

D. Miscellaneous nonferrous metal items not specified under other sections.

E. Fabrication and installation of metal work, including shop and field welding, drilling, cutting, connecting and shop painting.

F. Miscellaneous shapes, plates, angles, clip angles, supports, bolts, and specialty iron and steel items indicated and as necessary to complete the work, including, but not limited to, the following:

1. Pipe sleeves.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Division 06 Sections: Installation of anchorage and support items. Framing connectors for wood framing.

C. Section 07 6200 - Sheet Metal Flashing and Trim

D. Section 08 1113-Hollow Metal Doors and Frames.

E. Section 08 7100 - Door Hardware

F. Division 09 Sections: Metal-framed anchorage and support items.

G. Refer to pertinent sections of Division 09 for interior and exterior painting

H. Other sections requiring metal fabrications or referencing this section for fabrication and installation.

I. Pertinent Division 22, 23 and 26 sections: Sleeves and inserts for mechanical piping and ducts, and electrical conduit, bracing and support of mechanical and electrical equipment.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

I. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

K. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

L. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

M. ASTM E 935 - Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

N. AHDGA - American Hot Dip Galvanizing Association.

O. NAAMM MBG 531 - Metal Bar Grating Manual; The National Association of Architectural Metal Manufacturers; 2000 (ANSI/NAAMM MBG 531).

P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel.

R. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.

S. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.

T. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic).

U. SSPC-SP 2 - Hand Tool Cleaning.

V. SSPC (PM2) - Painting Manual, Vol. 2, Systems and Specifications; Steel Structures Painting Council; 1995.

W. ADA Standards - Americans with Disabilities Acat (ADA) Standards for Accessible Design; 2010.

X. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

Y. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, "CAL-Green".

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Include details of cuts, connections, camber, holes, and other pertinent data.

2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths, sizes and types.

C. Product Data: For each type of product indicated, demonstrate compliance with specified attributes.

1. Catalog cuts for all manufactured items demonstrating compliance with specified requirements.

2. Structural steel primer paint.

D. CAL-GREEN Submittals: Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

E. Welding procedures: For welding structural steel as required in accordance with AWS D1.1, submit prequalified joints.

F. Certification: Copy of approved fabricator's license.

G. Manufacturer's data: Submit certified copies of the following prior to any fabrication. Include laboratory test reports and other data as required to show compliance with these specifications, including specified standards.

1. Structural steel, including certified copies of mill reports covering the chemical and physical properties.

2. Unfinished bolts and nuts.

1.05 SUBMITTALS FOR RECORD

A. Section 01 3300 - Submittals: Procedures for submittals. Architect will not review these submittals.

B. Welders' Certificates: Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months, and are qualified in the State of California.

1.06 QUALITY ASSURANCE

A. Design criteria: Design, fabricate and erect miscellaneous metal items complete, in accord with AISC's Design, Fabrication and Erection of Structural Steel for Buildings.

B. Coordinate the Work under provisions of pertinent sections of Division 01.

C. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

D. Welding Inspection: All structural welding shall be specially inspected according to CBC 1704A and DSA IR-17-3 except as otherwise provided below.

1. Special inspection shall not be required if welding is done in an approved fabricator’s shop licensed in accordance with CBC 1704A.

1.07 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 6000.

B. Deliver anchor bolts, anchorage devices, sleeves and inserts, which are to be incorporated into other work in ample time to avoid delay.

C. Store materials to permit easy access for inspection and identification. Store steel materials off the ground, using pallets, platforms or other supports. Protect steel members, package materials and identifications from deterioration.

D. Store material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

E. Prevent contact with materials which may cause discoloration or staining. Clean materials which are discolored or stained.

F. Replacements: In the event of damage, immediately make repairs and replacements necessary to the approval of the Architect and Division of the State Architect without change in contract amount or time.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

2.02 MATERIALS - GENERAL

A. General: Furnish new tested stock complying with reference specifications.

B. Exterior Applications: Provide Type 316 stainless steel for all exterior fabrications and fasteners and locations in contact with pressure-treated wood materials.

C. Interior Applications: Provide plain steel for interior fabrications and fasteners except where specifically noted to be stainless steel or galvanized. Provide Type 304 stainless steel for fastening of

aluminum and stainless steel materials. Provide hot-dipped galvanized fasteners and material for fastening or in contact with pressure treated wood materials in interior applications.

2.03 STEEL MATERIALS

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: Hot formed, welded or seamless, ASTM A 501, or cold-formed, ASTM A500, Grade B cold-formed.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black and hot-dip galvanized finish, as indicated.

E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: As indicated on Drawings.

2. Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33 (Grade 230); with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.

3. Material: Cold-rolled steel, ASTM A 1008/A 1008M, structural steel, Grade 33 (Grade 230); 0.0966-inch (2.5-mm) minimum thickness; hot-dip galvanized after fabrication.

4. Slotted Channel Fittings: ASTM A1011/A1011M. Hot dipped galvanized for exterior exposure.

F. Bars and bar-size shapes: ASTM A 663, Grade 65, or ASTM A 36.

G. Sheets: ASTM A 653 with zinc-coating in accord with ASTM A 525, G-90.

H. Carbon steel sheets and strips:

1. Hot-rolled: ASTM A 568 and ASTM A 569, pickled and oiled.

2. Cold-rolled: ASTM A 1008.

3. Galvanized sheets: ASTM A 525, or A 526 with G-90 zinc coating

I. Steel plate, checkered pattern: Steel with checkered (diamond) pattern, galvanized, ASTM A 525, coating designation G90.

J. Hot-rolled carbon steel bars and bar-size shapes: ASTM A 575, Grade as selected by fabricator.

K. Fasteners - General: Select fasteners for type, grade, class and style required for installation, compatible with materials in contact.

1. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

a. Standard bolts and nuts: Regular square or hexagon head type, ASTM A 307, Grade A.

b. Lag bolts: hexagon head type, galvanized.

c. Machine screws: Cadmium-plated steel, ASTM F 468 and FS FF-S-92.

d. Plain washers: ANSI B18.22.1 and FS FF-W-92.

e. Anchors: Manufactured by Ramset Fastening System Division, Olin Corp., Rawlplug Co., Diamond Division, General Cable, Hilti or ITT Phillips Drill Division. Provide type best suited for intended application and indicate on shop drawings.

f. Lock washers: FS FF-W-84, helical spring type carbon steel.

g. Anchor Bolts: ASTM A307.

2. Screw Anchors: Simpson "TITEN HD" screw anchors or equal, carbon steel

3. Post-Installed Anchors: Simpson "SET-3G" Adhesive Anchors or equal, carbon steel, ASTM F1554 or ASTM A193

2.04 STAINLESS STEEL MATERIALS

A. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 316L.

B. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 316L.

C. Fasteners - General: Provide Type 316 stainless steel. Select fasteners for type, grade, class and style required for installation, compatible with materials in contact.

1. Provide Type 316 stainless steel at exterior applications and locations in contact with pressure-treated wood materials.

2. Provide stainless steel fasteners for fastening aluminum or stainless steel in all locations.

3. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 2 (A4).

4. Screw Anchors: Simpson "TITEN HDSS" Screw Anchors or equal, stainless steel

5. Post-Installed Anchors: Simpson "SET-3G" Adhesive Anchors or equal, stainless steel, ASTM A193

6. Eyebolts: ASTM A193 Grade B8M.

7. Machine Screws: ASTM F593 18-8 Stainless Steel.

8. Lag Screws: ASME B18.2.1, ASTM F593 18-8 Stainless Steel.

9. Plain Washers: Round, ASME B18.21.1, ASTM F593 18-8 Stainless Steel.

10. Lock Washers: Helical, spring type, ASME B18.21.1, ASTM F593 18-8 Stainless Steel.

2.05 FABRICATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. Allow for trimming and fitting where field conditions preclude accurate measurements or where final dimensions cannot be established prior to fabrication.

B. Fit and shop assemble items in largest practical sections, for delivery to site.

1. Minimize field splicing and site assembly. Disassemble only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

2. Complete assembly, including welding, before start of finishing operations. Provide finish surfaces of members exposed in the final structure free of markings, burrs, and other defects.

3. Use materials and items necessary to complete the work, using the best materials and methods ordinarily used for this type of work whether explicitly specified, indicated and detailed or not.

C. Fabricate items with joints tightly fitted and secured.

D. Machine-roll components or elements required to be curved or radiused. Do not field bend or "walk-down". Provide curves true to indicated dimensions, minimizing joints; segmented fabrication not allowed unless specifically noted.

E. Continuously seal joined members by continuous welds.

1. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

2. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

3. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

F. Use only materials smooth and free of blemishes including pitting, seam marks, roller marks, trade names and roughness.

G. Fabricate steel members in accordance with drawings and as recommended by A.I.S.C. Verify all dimensions with field conditions prior to fabrication.

1. Clean, prepare and shop-prime steel members. Do not prime surfaces to be field welded or in direct contact with concrete.

2. Galvanizing: ASTM A153, ASTM A123; all steel exposed to weather, except locations and items specified to be stainless steel.

3. Cutting and drilling: Provide holes for fabrication and for attachment of work specified elsewhere. Countersink holes for bolts and screws.

H. Welding: Comply with the AWS Structural Welding Code, and with the following:

1. Welds shall be free from excessive oxides, nonmetallic inclusions, and gas pockets.

2. Welds shall be uniform in section, smooth in weld metal, feather edged, without overlaps.

3. Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter.

4. Tack welds located in way of design welds shall be melted out when encountered in final welding, or shall be thoroughly fused in with final weld.

5. Use proper care and procedures to minimize locked-in stress and distortion.

6. Welder qualification requirements, welding procedure and welding electrodes shall conform to CBC 2204A and most recent editions of AWS D1.1, D1.3; CBC IR-17-3.

2.06 STEEL PIPE RAIN WATER LEADERS (RWL)

A. Steel pipe or tube rain water leaders: Fabricate to dimensions and details shown, with welded joints ground smooth and flush, hot-dipped galvanized.

1. Structural Performance: Rain water leaders shall withstand the following structural loads:

a. Concentrated Load: 200 lbs., applied non-concurrently, in any direction.

b. Uniform Load:50 lb/ft. applied simultaneously in both vertical and horizontal direction.

c. Concentrated loads and uniform loads need not be assumed to act concurrently.

2. Shop fabricate to greatest extent possible.

3. Interconnect rainwater leader members by butt-welding or by welding with internal connectors, unless otherwise indicated.

4. At intersections and changes of direction, notch ends of intersection members to fit contour of pipe and weld all around. Seal weld all joints water-tight.

5. Form changes in direction of water flow by mitered connections, maintaining cylindrical cross-section of pipe throughout bend without buckling, twisting, cracking or otherwise deforming exposed surface of pipe.

6. Provide support brackets of sizes and types indicated and with configurations required to suit substrates and framing spacing.

2.07 FINISHES - STEEL

A. Hot-dip galvanize steel items fully or partially exposed to exterior conditions or to wet environments such as locker rooms, food service, custodial or toilet rooms. Prime paint steel items in all other locations.

1. Exceptions: Galvanize items to be embedded in concrete or masonry.

2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2 SSPC SP-3, "Power Tool Cleaning", minimum. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent

Cleaning".

1. Review coating systems specified in other Sections. Provide level of substrate surface finish required or recommended by coating manufacturer for each specified system.

C. Prime Painting: One coat, primer in accordance with the coating manufacturer's printed instructions. Select products compatible with coating systems specified in other Sections.

D. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

E. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; color as selected from manufacturer's standard colors.

2.08 FINISHES - STAINLESS STEEL

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Directional Satin Finish: ASTM A480/A480M, No. 4.

2.09 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work. Correct conditions detrimental to the proper and timely performance of this work before proceeding with installation. Commencement of work indicates acceptance of substrates.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION - GENERAL

A. Install items plumb and level, measured from established lines and levels, accurately fitted, free from distortion or defects.

B. Provide temporary bracing or anchors in formwork for items which are to be built into concrete or similar construction.

C. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction; including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

E. Cutting and fitting:

1. Perform cutting, drilling and fitting required for installation of miscellaneous metal items. Fit exposed connections accurately together to form tight hairline joints.

2. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.

3. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.

F. Field weld components as indicated on drawings or as required to assemble shop-fabricated work on site. If field-welding is not specifically indicated on drawings, option is the Contractor's for efficient assembly.

G. Perform field welding in accordance with AWS D1.1/D1.1M.

H. Obtain approval prior to site cutting or making adjustments not scheduled.

I. Immediately after erection, clean and prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete with the same materials used for shop finishing.

3.04 INSTALLATION - SPECIFIC

A. Rainwater Leader Installation: Plumb units in each direction.

1. Accurately locate rainwater leaders in proximity to underground storm drain connections. Coordinate with work of other sections for accurate placement and alignment of the work.

2. Secure Rainwater Leaders to walls using wall brackets. Secure brackets and return fittings as follows:

a. Wood framing: Stainless steel lag screws.

b. Steel Framing: Stainless steel threaded self- tapping screws.

c. Masonry or Concrete: Stainless steel threaded tap-in anchor bolts.

d. Structural Steel column or member: Weld.

3. Locate supporting brackets at approximately equal intervals, not less than 5'-4" on center, not less than 18 inches from ends, with a minimum of three per supports per unit, and additional brackets within 18 inches of change in direction or substrate mounting material.

4. Connect rain water leaders to storm drains with water-tight connection.

3.05 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

3.06 PROTECTION

A. Protect finished work from damage until acceptance by Owner.

B. Repair and replacement: In the event of damage, immediately make repairs and replacements necessary to satisfaction of Architect without change in contract sum or time.

3.07 CLEAN-UP

A. When work of this section has been completed, and at such other times as may be directed, remove all trash, debris, surplus materials, tools and equipment from site.

B. Comply with pertinent requirements of Division 01 sections specifying Contract Closeout.

END OF SECTION

SECTION 06 1000

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: All labor, materials and equipment and all operations required to complete all rough carpentry and structural framing as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:

1. Structural floor, wall, and roof framing.
2. Floor, wall, and roof sheathing.
3. Rough hardware, framing connectors and fasteners.
4. Treatment of wood.
5. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and other work requiring supporting blocking.
6. Miscellaneous wood nailers and furring strips, including roof applications, other wood framing, furring, shims or blocking as required to complete the work.

B. Related Sections:

1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
2. Pertinent sections of Division 01 specifying Structural Product Requirements: Structural Product Options, Substitution procedures and limitations, transportation, handling and storage.
3. Pertinent sections of Division 03 specifying wood formwork construction and/or setting anchors in concrete.
4. Pertinent section of Division 06 specifying wood construction and materials.
5. Pertinent sections of other divisions specifying steel or concrete construction.

1.02 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 23 Wood.

B. American National Standards Institute (ANSI) / American Wood Council (AWC) “NDS - National Design Specification for Wood Construction”.

C. National Institute of Standards and Technology (NIST) / Engineered Wood Association (APA) “PS 1 - Voluntary Product Standard for Structural Plywood”.

D. NIST / APA “PS 2 - Performance Standard for Wood-Based Structural-Use Panels”.

E. NIST “PS 20 - American Softwood Lumber Standard”.

F. Redwood Inspection Bureau (RIS) “Standard Specifications for Grades of California Redwood Lumber”.

G. West Coast Lumber Inspection Bureau (WCLIB) “Standard Grading Rules for West Coast Lumber No. 17”.

H. Western Wood Products Association (WWPA) “Western Lumber Grading Rules”.

I. American Wood Preservers Association (AWPA) “Book of Standards”.

1.03 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication. Submittals that do not meet these requirements will be returned for correction without review.

1. Substitutions for products specified require conformance to substitution requirements in Division 01.
2. Review of materials and hardware for substitution to products specified is at the additional expense of the Contractor.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.

C. Product Data:

1. Submit manufacturer's product data, specifications, and installation instructions for & location of framing connectors, wood preservative materials, application instructions, and fasteners. Include complete, accurate equivalence data when submitting alternate products to those specified. Provide samples of these items upon request.
2. Submit product data and current ICC-ES report for machine-driven nails, fasteners, and equipment, including dimensions of all fasteners, including head, shank diameter and length.

D. Shop drawings: For manufactured wood products, submit each building as a complete unit. Do not mix components from multiple buildings or units of work in a submittal. Include all of the following;

1. Indicate profiles, sizes, and spacing locations of structural members.
2. Cross-reference all shop drawing detail references to contract document detail references.
3. Secure all field measurements as necessary to complete this work.

E. Manufacturer's Certificate: Submit all certifications of physical and chemical properties of materials as specified below in Article titled QUALITY ASSURANCE.

1. Certify that wood products supplied for rough carpentry meet or exceed specified requirements, including specified moisture content.

1.04 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies, refer to pertinent sections of Division 01 and CBC Chapter 17A.

B. All tests shall be performed by a recognized testing agency as specified in pertinent sections of Division 01.

C. Inspection of fabricators is required per CBC 1704A.2 unless fabricator is registered and approved by the building official. Wood product quality standards:

1. All wood products to comply with article REFERENCES.
2. Factory-mark each piece of lumber and sheathing with type, grade, mill, and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
3. Sheathing panels to be marked by APA (The Engineered Wood Association).

D. End-Jointed lumber shall not be used.

E. Hardware and engineered wood products shall have current ICC ES Evaluation/research reports that are equivalent to products specified.

F. Employ competent workers experienced in work of the types specified and required.

1.05 MOCK-UP

A. Construct mock-ups of machine-driven nailed sheathing panels using submitted products and demonstrating conditions indicated. Locate where directed.

B. Mock-up shall be accepted and approved by the Inspector of Record (IOR) before commencement of machine-driven nailing activity.

C. Accepted mock-up shall remain exposed for reference for the duration of machine-driven nailing activity.

D. Remove all mock-ups at the completion of the work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent requirements of Division 01.

B. Delivery: Time delivery and installation of carpentry products to avoid delaying other trades whose work is dependent on or affected by this section and to comply with moisture content, protection and storage requirements.

C. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and sheathing panels to prevent deformation and provide air circulation within stacks.

1. Store materials for which a maximum moisture content is specified only in areas where relative humidity has been reduced to a level where specified moisture content can be maintained.
2. Handle and store materials above ground to prevent damage, contamination, or accumulation of dirt or foreign materials.
3. Provide special protection for horizontal sheathing panels. Deformation of panels due to moisture is not acceptable.

1.07 PROJECT/SITE CONDITIONS

A. Verify all conditions at project site affecting the work; work to field dimensions as required. Coordinate carpentry installation with size, location, and installation of service utilities.

B. Sequence rough carpentry installation activities to allow sufficient time for:

1. Review of all submittals.
2. Fabrication of mock-ups and required durations as specified.
3. Indicate submittal review, procurement, mock-up, and testing activities in the project schedule prior to the start of installation. Installation durations shall be based on hand-nailed installation methods specified.
4. Attainment of specified maximum lumber moisture content.

PART 2 PRODUCTS

2.01 DIMENSIONED LUMBER

A. General

1. Size per industry standards for nominal sizes shown; S4S (sanded four sides).
2. Warped/twisted and excessively checked members shall not be used regardless of grade marks.
3. At the Contractor's option, engineered lumber of equivalent size and material properties may be substituted for solid sawn lumber where material is difficult to source due to length, availability, etc. Submit proposed substitution to Engineer for review prior to purchasing materials.

B. Moisture content of framing:

1. All lumber to be maximum 19% at time of fastener installation. All lumber to be maximum 19% at time of close-in, unless noted otherwise.
2. The Owner's Testing Laboratory will test for moisture content prior to commencement of close-in.
3. The Contractor shall recognize that excessive shrinkage of lumber results from excess moisture content at the time of installation. The Contractor will compensate for use of such lumber by waiting for acceptable moisture content before close in and/or by replacing/repairing lumber that has sagged, twisted, or warped prior to close in.
4. Deviation from this specification would require structural redesign of connections and fasteners.

C. Sills/ledgers on concrete or masonry: No. 2 pressure treated Douglas Fir and as called for on the drawings.

D. Interior structural framing shall be Douglas Fir (D.F.) with grades as noted below, unless otherwise specified on the drawings. All grades are per WCLIB standard grading rules.

1. All permanently exposed (interior or protected from weather) framing shall be select structural grade with no box heart.
2. Except per 1 above, unless noted otherwise, minimum grades are:
   a. Floor/roof joists/rafters (2x) and 2x8 & larger studs & plates: D.F. No. 1
   b. 2x4 and 2x6 studs and plates: D.F. No. 1
   c. 4x and larger: D.F. No. 1
   d. Blocking: D.F. No. 2
   e. 6x8 and larger posts and beams may be SGL/CGL per below unless noted otherwise on the drawings.

E. Exterior structural framing (exposed to weather) shall be redwood select structural grade or pressure treated D.F. No. 1, unless noted otherwise.

F. Structural decking shall be D.F. select decking or White Pine select where not exposed to moisture. Where directly exposed to moisture or high humidity for prolonged periods of time, decking shall be Alaskan Yellow Cedar or Port Orford Cedar. Moisture content at time of installation to be less than 12%.

G. Framing not otherwise shown or specified: Douglas Fir construction grade per WCLIB paragraphs applicable to uses and sizes required.

2.02 STRUCTURAL SHEATHING PANELS

A. Plywood: Structural sheathing shall conform to product standard PS-1 or PS-2. All panels shall have a minimum bond classification of "Exposure 1" and bear the trademark of the Engineered Wood Association (APA) or other qualified agency. Grades shall be "Rated Sheathing" or "Structural 1" as required on the drawings.

B. Oriented Strand Board (OSB): All structural OSB shall be grade marked by a qualified agency for conformance with Product Standard PS-2 and shall be fabricated with exterior glue. Grades shall be as required on the drawings.

2.03 TREATED WOOD:

A. Treated Lumber and Plywood: Comply with requirements of AWPA Standard U1. See Standard U1 for "Use Category" designations. Do not provide higher Use Category lumber than that specified. Maximum moisture content shall be the same as required for "dimensioned lumber" as specified above.

B. Preservative Treated Lumber

1. General
   a. Preservatives shall be waterborne. Preservative retention rate shall be as required per AWPA Standards U1 & T1. Lumber shall be Douglas Fir No. 2 (or better). Cut faces of treated wood shall be brush treated (two complete applications) prior to installation.
   b. Lumber less than 8 inches above grade and lumber less than 6 inches above exterior hard-surface flatwork shall be treated.
   c. Each piece of wood shall be stamped by the wood preservative applicator to identify its treatment and preservative retention.
2. Lumber at interior, non-weather exposed locations installed adjacent to concrete or masonry shall be Use Category UC2. Examples include sill plates & ledgers and lumber in contact with roofing, flashing, or water proofing. Borate treated lumber meeting AWPA UC2 is acceptable in this application.
3. Lumber at exterior locations, not in contact with soil/ground, shall be Use Category UC3B. Examples include Douglas Fir decking and deck framing.
4. Lumber in contact with soil/ground shall be Use Category UC4A. Examples include timber retaining walls.
5. Poles, posts, and sheathing panels shall be treated as recommended by AWPA Standard U1 per use and exposure.
6. Maximum Volatile Organic Compound (VOC) content of field-applied preservative shall meet local air quality standards and the California Green Building Code. Provide either of the following:
   a. Copper Azole (CA-B) per ICC-ES AC326.
   b. Alkaline/Copper/Quaternary (ACQ).

C. Fire Retardant Treatment: Product and application process must be recommended by manufacturer of treatment as being suitable for painting. Application shall be by a California State Fire Marshal approved licensed contractor.

1. Exterior Type: Use Category UCFB, chemically treated, and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
   a. Treat exposed exterior rough carpentry items, including stairways, balconies, and covered walkways.
   b. Do not use treated wood in direct contact with the ground.
2. Interior Type: Use Category UCFA, low temperature (low hygroscopic) type, chemically treated, and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Treat rough carpentry items as indicated.
   b. Do not use treated wood in applications exposed to weather or where the wood may become wet.

2.04 FASTENERS AND ACCESSORIES

A. General requirements for fasteners:

1. Fasteners shall be of adequate size, spacing, and number to resist design loads under intended use, and types shall be appropriate for the materials or conditions for which used.
2. Provide washers, pre-drilling, etc. as required for proper installation and to prevent damage to framing.
3. Fasteners shall be hot-dip galvanized (ASTM A153), mechanically galvanized (ASTM B695 class 55 minimum), stainless steel (type 303, 304, 305, or 316), silicon bronze, or copper by approved methods for the following applications:
   a. Exterior, exposed use.
   b. In contact with preservative or fire-retardant treated wood.
   c. Nails in contact with preservative treated wood containing ammonia shall be stainless steel.
4. Fasteners in moist corrosive atmosphere to be of stainless steel (type 303, 304, 305, or 316).
5. Where the retention level of ACQ or MCQ preservative is greater than 0.40 pcf, CBA-A preservative is greater than 0.41 pcf, or CA-B preservative is greater than 0.21 pcf, provide stainless steel fasteners (type 303, 304, 305, or 316).
6. All fasteners specified by manufacturer shall be installed in framing hardware, unless noted otherwise.
7. At borate treated lumber a clear zinc coating per ASTM F1941 is acceptable.

B. Nails and nailing not otherwise shown or specified:

1. Comply with requirements of governing building code.
2. For securing materials to hardened concrete or masonry provide hardened steel masonry nails or Simpson Strong-Tie “Titen” screws.
3. For framing and general woodwork: Common bright wire nails (not box nails) with centered full-round heads per ASTM F1667 including Supplement S1. 16d cement coated sinker nails may be used in lieu of common nails for framing, where noted on the drawings. Unless otherwise noted on drawings, nail sizes shall be as follows:
   a. 8d Common: 0.131”ø x 2-1/2” long with 0.281”ø head.
   b. 10d Common: 0.148”ø x 3” long with 0.312”ø head.
   c. 16d Common: 0.162”ø x 3-1/2” long with 0.344”ø head.
4. Nails for sheathing panels shall be of common wire with full round heads and shall be of sufficient length to fully develop the nails.
5. Machine-driven nails of all types must comply with the requirements of this section. All proposed nails shall match diameter and penetration of specified nails.
6. Staples shall conform to length and gauges specified and shall be installed to match specified patterns and spacing.
7. Power Actuated Fasteners (PAF): Use only as approved by the Architect/Engineer; operators shall be qualified.

C. Bolts: Malleable iron washers or steel plate washers, unless otherwise shown, shall be provided under all bolt heads and nuts.

1. Machine Bolts: ASTM A307 and ANSI/ASME B18.2.1, standard semi-finished machine bolts as shown or required. Nuts shall be standard size unless noted otherwise and shall be per ASTM A563.
2. Anchor bolts or threaded rod anchors shall conform to ASTM F1554, ASTM A307, or ASTM A36. Anchor bolts shall be headed or end in two nuts tightened against one another, unless noted otherwise. Provide embedded plate washer as indicated on drawings. No upset threads allowed. No L or J bolts allowed.

D. Lag screws: Standard hex lag screws per ANSI/ASME B18.2.1.

E. Wood screws: Standard wood screws per ANSI/ASME B18.6.1.

F. Power Actuated Fasteners (PAF): Hilti X-CP72, ICC ESR-2379; Simpson PDPAWL-300 MG, ICC ESR-2138.

G. Framing hardware: Fabricated sheet metal timber framing connectors shall be manufactured from painted or galvanized G90 steel by Simpson Strong-Tie (connectors specified on drawings are per Simpson Strong Tie, or approved equivalent. Connectors shall be at least 16 gauge material, (1/8 inch plate materials where welded), unless otherwise noted, punched for nailing. All heavy hardware to be fabricated from A36 steel per Division 05, Metals. All hardware intended for exterior exposed use shall be galvanized per G185 ASTM A653 or stainless steel.

1. For contact with preservative or fire-retardant treated wood, provide minimum G185 galvanizing per ASTM A653.
2. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. Nails to be used with framing accessories are subject to the requirements specified in this Section for fasteners and anchors.

H. Subfloor Glue: Water proof, water base, air cure type, cartridge dispensed conforming to APA Standard AFG-01 or ASTM D3498. Maximum Volatile Organic Compound (VOC) shall meet local air quality standards and the California Green Building Code.

2.05 SOURCE QUALITY CONTROL

A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform testing for moisture content of all lumber at time of fastener installation.

B. The Testing Agency will submit reports as specified in Division 01.

PART 3 EXECUTION

3.01 REQUIREMENTS FOR STRUCTURAL FRAMING

A. General

1. Refer to drawings for layouts, notes and details, provide framing as required; comply with governing building code requirements.
2. Provide framing to achieve true alignments as surfaces receiving finish materials.
3. It shall be the responsibility of the Contractor to provide and install all wood blocking, furring strips, or grounds detailed or required to provide anchorage for all finishes, accessories, fixtures, etc. as required to complete all work. All blocking and/or backing shall be securely bolted or otherwise anchored in place.
4. Contractor shall be responsible for layout of anchor bolts, and other hardware embedded in concrete when placed by other trades.
5. Provide and install all structural framing, blocking, fasteners, brackets, clips, etc. as required to complete work specified in the Construction Documents.

B. Framing

1. Sill Plates and Ledgers:
   a. Sill plates and ledgers on concrete shall be anchored with bolts, unless noted otherwise, shall have full bearing on concrete, and shall be placed for sheathing panel nailing as indicated. All bolt nuts shall be provided with a cut plate steel washer for bearing on wood.
   b. Provide a minimum of two sill anchor bolts per sill piece with a bolt no less than 4 ½" and no more than 12" from the end of the sill. Bolts to be 5/8" diameter x 12" (18" at curb) long at 48" on centers, unless otherwise shown or noted. Provide additional anchor bolts each side of a notch or hole, as per a typical plate splice, where notch or hole is in excess of 1/3 the plate

width. At shear walls, provide a plate washer 3” x 3” x 0.229” minimum between the sill and nut at anchor bolts. Plate washer to extend within ½ inch of the structural wall sheathing. Offset and/or stagger anchor bolts, or provide larger plate washer as required.

c. Anchor bolt holes in sill plates or ledgers shall be 1/16" maximum larger than anchor bolt.

2. Stud Walls and Framing:
   a. Cut studs and posts with square ends, unless otherwise shown or noted. All posts and beams shall be "cut to bear" unless otherwise detailed.
   b. All studs in walls shall be placed with the shortest dimension parallel to the run of the wall. Bearing studs shall extend full height to be the supporting framing as shown; non-bearing studs shall extend to the supporting framing.
   c. Provide double studs on each side of all openings, unless shown or noted otherwise.
   d. All openings in stud walls and partitions shall be framed with headers across the top, as shown, with a minimum size (6" nominal depth x stud width) resting on short cripple studs, and as shown on the drawings.
   e. All stud partitions and walls shall have horizontal solid blocking not less than 2x and of the same width as the stud, fitted and nailed into the studs at mid-height of stud, for studs over 8 feet in height, except as otherwise shown or specified. This blocking shall be so spaced that there shall be no concealed air spaces greater than eight feet in any dimension.
   f. Stud partitions containing plumbing, heating or other pipes shall be so framed as to give proper clearance for piping. Plumbing, heating and vent pipes exceeding 1-1/2" in inside diameter shall not be placed in partitions used as bearing or shear walls unless completely furred clear of the wall. No notching shall be allowed. Pipes shall be placed in the center of the plate using a neat bored hole and the plates shall be strapped on each side with 3" x 36" x 14 gauge steel punched for 10d nails 3" on center, staggered, or as shown on the drawings.
3. Top Plates
   a. Top plates shall be double, set single. Corners where stud wall or partitions meet shall be framed with studs on all surfaces and blocking to form a "rigid" corner with nailing for all corners. Double top plates shall be lapped at corners. Lap splices and nailing per the drawings.
4. Floor, Roof and Ceiling Framing
   a. Joists and beams shall be accurately aligned and the position and spacing of all joists and beams shall be as shown and be coordinated with other framing and to other trades prior to actual construction.
   b. Place all joists and beams with crown up. Cantilevered joists and beams shall be placed with the crown down.
   c. Cutting of wood girders, beams or joists for electrical and mechanical lines shall be limited to cuts and bored holes not deeper than 1/5 of the beam depth from the top and located not farther from the support than three times the beam depth and not less than the beam depth. Cuts in excess of this, or single bored holes with a diameter of more than 1" are not permitted without special provisions for framing the beams. Location of all cuts in framing shall receive the prior review of the Architect/Engineer.
   d. Provide vent holes in rafters and/or blocking as shown and/or directed by the Architect.

3.02 STRUCTURAL SHEATHING

A. General

1. Sheathing nailing shall be as required on the drawings. Do not overdrive (Do not break skin of sheathing face sheet). Over driving will be cause for rejection.
2. Form sheathing may be re-used for concealed sheathing provided the lumber at the time of re-use is approved by the Architect, meets with the framing grade requirements specified herein, is in good condition, and is thoroughly cleaned with all nails removed.
3. Pneumatic nailing devices shall be adjustable so that nail heads do not penetrate skin of sheathing. Contractor shall submit equipment and nails for review prior to use. Refer to PART 2 for other nailing requirements.

B. Roof and Floor Sheathing: Except "Panelized Roofs", lay with face grain perpendicular to roof rafters, roof trusses or floor joists. Stagger sheets. Block all unsupported sheet edges with 2x material unless noted otherwise.

C. Wall Sheathing: Lay with face grain either parallel or perpendicular to studs. Exposed bottom edges shall be sealed as recommended by manufacturer. Block all unsupported sheet edges with 2x materials unless noted otherwise.

D. Panelized Roofs: Where sheathing is set @ 8'-0 1/8" spacing, cut every fourth sheet short by 1/2" to re-align structural framing that has been specified to be spaced at even units of 2, 4 or 8 feet.

3.03 ROUGH HARDWARE

A. General: Nails, spikes, screws, fabricated sheet metal anchors, ties, hangers and any other materials shown or required for the attachment of wood to concrete and wood to steel and wood to wood shall be furnished and installed as part of this work.

B. Framing Nailing: All framing nailing shall conform to minimum requirements of the Building Code, and with details shown on the drawing.

C. Bolts, Lag Screws and Washers:

1. Bolts in wood shall be machine bolts unless otherwise noted and shall be of such length that the bearing length of the threads does not exceed ¼ of the full bearing length in the member holding the threads. Bolt holes in wood shall be 1/32" oversized. Bolt holes for sill plates may be 1/16" maximum oversize. Holes in steel shall be 1/16" oversize. See Section 3.1 for anchor bolts at sill plates and ledgers.
2. Provide square plate or malleable iron washer and nut at head where bearing is against wood; cut washer under nut where it is against steel. Washer will not be required under head of carriage bolts. Provide malleable iron washers where exposed.
3. All nuts shall be tightened when placed and retightened at completion of the job or immediately before closing with final construction.
4. Lag screws shall be screwed (not driven) into place. Drill pilot hole to 70% of shank diameter. Drill clearance hole to full shank diameter and depth of unthreaded screw length.

D. Wood Screws: Minimum penetration is 10 diameters unless noted otherwise. Where fastening hardwood timber species or where wood tends to split, provide pilot hole 70% of screw shank diameter.

E. Proprietary Fasteners and Hardware: Install per manufacturer’s published installation instructions (MPII) and code approval report (e.g. ICC ESR, IAPMO ER, etc). Provide MAX quantity, size, and length of fastener at hardware (i.e. joist hangers, framing, clips, etc) unless otherwise noted per plan.

3.04 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

A. Coordinate installation of wood decking, metal-web wood joists, glued-laminated wood construction, shop-fabricated wood trusses, and wood I- joists.

B. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members. Fasten curbs corner-to-corner and to rafters with framing connectors configured for this application.

C. Blocking:

1. Provide fire blocking at locations and spacing's as required by CBC Chapter 7. Locate other blocking, supplementary framing, backing plates and bracing to facilitate installation of finish materials, fixtures, equipment, services, accessories, and trim requiring attachment and support.
2. Solid block joists and rafters over all supports with blocking of the same size and material as the joist or rafter.

D. Furring:

1. Nominal 1 inch x 3 inch minimum, continuous and spaced at 16 inches on center, maximum.
2. Install plumb, rigid, and level. Shim where necessary to provide a true, even plane suitable to receive the finish required.
3. Attach to concrete and masonry as shown in the contract drawings.

E. Bridging: Use 2 inch solid cross bridging. Nail bottom ends of bridging only after sheathing has been nailed.

F. Stair Framing: Provide with 3 stair stringers for each set of stairs, unless otherwise shown. Cut notches to receive exact size of treads and risers (if any) shown, with no change in dimensions between landings. Provide stringers of size shown, or if not shown, of a size to allow not less than 3-1/2 inch of effective depth, measured perpendicular to the rake of the stringer, after notching.

G. Install miscellaneous metal angles, bolts, and other items; secure into formwork where embedded in concrete.

H. Install accessory items not otherwise set under other sections; after completion of painting and other finishing work; in locations shown or directed by the Architect. Set items plumb, level, and secure using appropriate fastening as applicable.

3.05 FIELD APPLIED WOOD TREATMENT

A. Field treat all end cuts and holes in preservative treated materials per PART 2.

B. Apply two brush coats; or full-immersion dip not less than 15 minutes; or as required to thoroughly saturate all surfaces after cutting.

C. Air dry 2-hours minimum before installation.

3.06 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

C. Variation from Plane (Other than Floors): 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum. Provide framed substrates meeting requirements for application of finishes specified in other sections.

D. Exposed surfaces shall be free from dents and tool marks, unsanded rough or torn faces and corners, and other defects.

3.07 FIELD QUALITY CONTROL

A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following tests and submit reports as specified in Division 01:

1. Moisture content of all lumber at time of close-in.
2. Periodic special inspection of nailing, bolting, and other fastening within the seismic-force-resisting system including shear walls, wood diaphragms, etc. per CBC Section 1705A.13.2.
3. Special inspection of high load diaphragms per CBC Section 1705A.5.1 where designated on documents.

3.08 ADJUSTING

A. Replace all defective work at Contractor's expense.

B. Replace defective or damaged work with conforming work.

C. Correct defects using means that will not injure the materials.

D. Replace defective or damaged work which cannot be corrected in the field with new work, or return defective items to the shop for repair.

E. Repair or replace framing lumber sagged, twisted or warped due to shrinkage from excessive moisture content at time of installation, or from other causes.

F. Adjust to meet specified tolerances.

G. Architect/Engineer shall review all proposals for the repair or replacement of damaged, defective, or missing work.

H. Pay expenses incurred by Owner for Architect/Engineer's costs for (re-)design and obtaining approvals of Authorities Having Jurisdiction (AHJ) necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work.

I. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work.

3.09 CLEANING AND PROTECTION

A. Clean all surfaces upon completion of erection, leave free of grime and dirt. Remove unused materials, tools, equipment, and debris from the premises and leave surfaces broomed clean.

B. Waste Disposal: Comply with the requirements of pertinent sections of Division 01 specifying cleaning and disposal.

1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

C. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

D. Prevent sawdust and wood shavings from entering the storm drainage system.

E. Protect work from damage by subsequent operations.

END OF SECTION

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

B. Interior and exterior wood trim;

C. Wood casings and moldings.

D. Hardware and attachment accessories.

1.02 RELATED SECTIONS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

D. Section 06 4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.

E. Section 08 1416 - Flush Wood Doors.

F. Section 09 9123 - Interior Painting: Painting and finishing of finish carpentry items. Backpriming of finish carpentry.

1.03 REFERENCE STANDARDS

A. ASTM Standards: A153, A165, D 226

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.

E. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.

F. BHMA A156.9 - Cabinet Hardware.

G. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

H. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

I. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.

J. PS 1 - Structural Plywood.

K. PS 20 - American Softwood Lumber Standard.

L. PS-51 for decorative plywood.

M. Redwood Inspection Service (RIS): "Standard Specifications for Grades of California Redwood Lumber", www.calredwood.org.

N. West Coast Lumber Inspection Bureau (WCLIB): "Standard Grading and Dressing Rules No. 16".

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals for submittal procedures.

B. Product Data:

1. Manufacturer's storage, handling and installation instructions

2. Provide instructions for attachment hardware and finish hardware.

C. CAL-GREEN Submittals:

1. Product Data – VOC Limits: For adhesives, sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

2. Composite Wood Formaldehyde Limits: Provide certification that all products meet current CARB Airborne Toxic Control Measure (ATCM) for Composite Wood Formaldehyde Limits by Mandatory Compliance Dates as specified in related section.

D. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.

2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

E. Mill grade certificate, if material cannot be marked on a concealed surface.

F. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, and details of anchorage, to a minimum scale of 1-1/2 inch to 1 ft.

G. Samples of materials for making stain and transparent finish samples.

1. Following review, provide samples to other Sections for application of finishes.

H. Samples: Submit two samples of finish plywood, 8 inch x 10 inch in size illustrating wood grain and specified finish.

I. Samples: Submit two samples of each wood trim profile, 12 inch long.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with Woodwork Institute Manual of Millwork, Custom grade.

B. Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency identification; except omit marking from surfaces to receive transparent finish.

C. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Wood: Store indoors, in well ventilated area at maximum relative humidity of 60 percent and in accordance with WIC technical bulletin 419-R.

B. Protect from moisture damage.

1.07 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

B. Coordinate the work with plumbing rough-in, electrical rough-in, installation of associated and adjacent components, and interior finishes.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Composite Wood products must meet current CARB Airborne Toxic Control Measure (ATCM) for Composite Wood Formaldehyde Limits by Mandatory Compliance Dates as specified in Section 01 6116.

2.02 FINISH CARPENTRY ITEMS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Interior Woodwork Items:

1. Bench seats at locker room.

2.03 LUMBER MATERIALS

A. Exterior wood: Dry; with moisture content up to 15 percent, unless otherwise indicated.

B. Interior wood: Dry; with moisture content between 6 and 12 percent, unless otherwise indicated. Finger joints not permitted. WI manual, Section 3 and Section 4; “Custom Grade”

1. Softwoods:

a. Opaque Finish: Clear; western softwood.

2. Hardwoods: Transparent finish, plain sawn “Select White” maple.

2.04 SHEET MATERIALS

A. Hardwood Plywood: Face species as indicated, plain sawn, book matched, medium density fiberboard core; HPVA HP-1, Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.

2.05 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

B. Rough Hardware and fasteners: Provide nails, screws, anchor bolts, machine bolts, expansion sleeves, lag screws, powder driven fasteners, joist hangers, straps, and other framing anchors of the size and type required to securely attach finish carpentry to substrates.

1. Nails:

a. Exterior Trim Exposed: Nichols-Homeshield, Independent Nail and Packing,

2. Other Exterior Work: Hot-dip galvanized steel.

3. Interior Work: Steel, typical unless otherwise indicated.

4. Screws, Bolts, Washers:

a. Exterior Work: Hot-dip galvanized steel, ASTM A153.

b. Interior Work: Cadmium plated steel, ASTM A165.

5. Framing Devices:

a. Exterior Work: Hot-dip galvanized steel, ASTM A153.

b. Interior Work: Plated, ASTM A165; or painted steel.

C. Concealed Joint Fasteners: Threaded steel.

D. Locker room Bench brackets: see 10 5113 Metal Lockers

2.06 ACCESSORIES

A. Construction Adhesive: Type recommended by fabricator to suit application.

B. Adhesive and Tape

1. Wood Adhesive: Essex Chemical "Webtex 588", Inmont "Presstite 220", 3M "Scotch-Grip 4314" or equal.

C. Lumber for Shimming and Blocking: Softwood lumber of _____ species.

D. Aluminum Edge Trim: Extruded flat shape; smooth surface finish; self locking serrated tongue; of width to match component thickness; Selected finish. Sizes and profiles as indicated and as recommended by manufacturer to suit application. Fry Products or equal.

E. Safety Glass: ASTM C1048, fully tempered; clear; 1/8 inch thick, minimum.

F. Primer: as specified in pertinent sections of Division 09 for finish type indicated.

G. Wood Filler: Solvent base, VOC Compliant, tinted to match surface finish color. Duratite "Wood Dough", Boyle-Midway "Plastic Wood" or equal.

2.07 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Mill and fabricate units and pieces as long as practical.

C. Finish and assemble at shop to greatest extent possible.

D. Finish to specified standards of Architectural Woodwork Standards (AWS) Manual.

1. Opaque finish, unless otherwise indicated.

E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify location of blocking, adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 PREPARATION

A. Separate units and condition wood materials for a minimum of 72 hours. Allow wood to achieve prevailing humidity conditions in installation areas prior to installing.

B. Backprime lumber, including side and ends, before installation for:

1. Exposed exterior surfaces;

2. Where surface is exposed to interior moisture and high relative humidities.

3.03 INSTALLATION

A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Trim and bases: Install with minimum number of joints possible. Use full-length pieces from maximum lengths of lumber available.

1. Stagger joints in adjacent and related members.

2. Cope at returns and miter at corners. Produce tight fitting joints with full surface contact throughout length of joint.

3. Joints: End-to-end

a. Wood: Scarf.

4. Locate wood bases above subfloor by the thickness of finish flooring.

C. Set and secure materials and components in place, plumb and level.

D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

E. Building paper: Install under exterior wood; without holes or tears.

F. Lap flashings to weather to the exterior.

1. Lap horizontal edges 3-inches minimum and vertical edges 6-inches minimum

2. Lap sheet metal flashings; double layer at corners by extending 6-inches around corner from each side.

G. Anchorage: Drill pilot holes for nails where necessary to preclude splitting or chipping of material .

1. Anchor finish carpentry work to anchorage devices or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners.

H. Blind nail where possible and use fine finishing nails for exposed nailings, countersunk and filled flush with finished surface.

I. At exterior locations drive nails flush.

3.04 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth. Prepare in accordance with level of finish specified in Section 09 9000.

B. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.05 TOLERANCES

A. Tolerances

1. Install the work plumb, level, true and straight with no distortions. Conceal shims.

a. 1/16-inch maximum offset in flush adjoining surfaces.

b. 1/8-inch maximum offset in revealed adjoining surfaces.

2. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

B. Maximum Variation from True Position: 1/16 inch.

3.06 ADJUSTMENT AND FINISHING

A. Ease salient corners and edges and sand all exposed surfaces of smooth finish wood.

B. Repair damaged and defective finish carpentry work wherever possible to eliminate functional and visual defects. Chipped or split materials is considered a defect.

C. Replace where repair is not possible.

D. Adjust joinery for uniform appearance.

END OF SECTION

SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood Casework.

B. Laminated Plastic Casework.

C. Cabinet Hardware.

D. Preparation for installing utilities.

1.02 RELATED SECTIONS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Pertinent sections specifying wall framing, support framing, grounds, and concealed blocking.

C. Section 06 2000 - Finish Carpentry

D. Division 09: Pertinent sections specifying finishes adjacent to cabinets.

E. Section 12 3600 - Countertops.

F. Pertinent sections specifying plumbing and/or mechanical equipment interfacing cabinets.

G. Pertinent sections specifying lighting and/or electrical equipment interfacing cabinets.

1.03 REFERENCE STANDARDS

A. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 2.0; 2014.

B. NEMA LD 3 - High-Pressure Decorative Laminates.

C. WI (CCP) - Certified Compliance Program (CCP).

D. WI (MCP) - Monitored Compliance Program (MCP).

E. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

F. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

G. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories, hardware location and schedule of finishes.

1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.

2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

3. Include certification program label indicating that drawings fully meet the requirements of the AWS Millwork Grade specified.

C. Product Data: Provide data for specified products, including hardware accessories. Demonstrate compliance with specified attributes.

D. CAL-GREEN Submittals:

1. Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section..

2. Composite Wood Formaldehyde Limits: Provide certification that all products meet current CARB Airborne Toxic Control Measure (ATCM) for Composite Wood. Formaldehyde Limits by Mandatory Compliance Dates as specified in related section.

3. Product Data - Low/No-VOC Paints and Coatings. Provide certification that all primers and coatings meet VOC emission limits specified in related section. List manufacturer, brand, application, type (flat or non-flat), number of gallon, and the VOC emissions in grams/liter. Include MSDS and product data sheet indicating VOC limits for each product provided.

E. Samples:

1. Full range of plastic laminates and edge tapes available from the specified group, of the specified manufacturer.

2. Submit two samples of each hardware item to be provided, illustrating hardware finish .

3. Three 12" x 12" finished samples of each veneer species and finish to be used and three 6" x 12" finished samples of each lumber lumber species and finish.

F. Closeout Submittals: AWS certificates of compliance indicating that installation fully meets requirements of AWS Millwork Grade specified.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.

2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

3. Single Source Responsibility: Provide and install this work from single fabricator.

B. Quality Certification:

1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

2. Provide designated labels on shop drawings as required by certification program.

3. Provide designated labels on installed products as required by certification program.

4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

5. Replace, repair, or rework all work for which certification is refused.

C. Single Source Responsibility: A single manufacturer shall provide and install the work described in this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

B. Do not deliver woodwork, until the area of operation is enclosed, painting, wet work, grinding, overhead work and similar operations which could damage, soil or deteriorate woodwork are complete and the area is broom clean.

C. If woodwork is stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

D. Do not install woodwork until required temperature and relative humidity are stable and will be maintained in installation areas.

1.07 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces in the range recommended by the Architectural Woodwork Standards for the location of the project.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Composite Wood products must meet current CARB Airborne Toxic Control Measure (ATCM) for Composite Wood Formaldehyde Limits by Mandatory Compliance Dates as specified in related section.

2.02 MANUFACTURERS

A. Single Source Responsibility: Provide and install this work from single fabricator.

2.03 CABINETS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI (AWS) for Grades as indicated. Refer to SCHEDULES article.

1. Provide Custom Grade minimum.

B. Plastic Laminate Faced Cabinets:

1. Exposed Interior Surfaces: Low Pressure Melamine in a pattern or color compatible with the exposed surfaces unless otherwise noted.

2. Semi-Exposed Surfaces: White melamine.

C. Cabinets:

1. Door and Drawer Front Edge Profiles: Square edge with thin applied band.

a. Door and drawer fronts shall be 3/4 inch thick.

2. Backs shall be full 3/4 inch thick.

3. Casework Construction Type: Type A - Frameless.

4. Interface Style for Cabinet and Door: Style 1 - Overlay; reveal overlay.

a. Where doors are notched for hinges seal exposed edges of core with paint to match adjacent panel surface.

5. Cabinet Design Series: As indicated on drawings.

a. Fabricate cabinets with openings and mortises precut, to receive hardware, appliances, plumbing, fixtures, electrical work and similar items.

b. Smooth edges of cutoffs and, where located in countertops and similar exposures, seal edges of cutouts with a water resistant coating.

6. Adjustable Shelf Loading: 50 lbs. per sq. ft..

a. Deflection: L/144.

b. Shelves over 36 inch in length, fixed or adjustable, shall be 1 inch thick.

7. Cabinet Doors and Drawer Fronts: Flush style.

8. Drawer Side Construction: Multiple-dovetailed.

2.04 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.05 LUMBER MATERIALS

A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber at time of fabrication and for relative humidity conditions in the installation areas.

2.06 PANEL MATERIALS

A. Particleboard: Not permitted. Do not use.

B. Acceptable Medium Density Fiberboard Manufacturers:

1. Roseburg, Springfield, OR; web: www.roseburg.com_.

2. Substitutions: See Section 01 6000 - Product Requirements.

C. Medium Density Fiberboard (MDF) Panels: ANSI A208.2, Grade 155. No added formaldehyde. Medite II MDF as follows;

1. Faces not required to be HPDL or wood veneer may be melamine, polyester or high-pressure laminate at fabricator's option. Color selected by Architect from full range of manufacturer's options, minimum of three choices.

2. Composition: Lignocellulosic fibers and formaldehyde-free synthetic resin.

3. Density: 44 to 49 lb/cu ft.

4. Thickness: 1/4 to 1-1/4 inches, as indicated on drawings or as required by referenced standard for conditions indicated or necessary.

5. Formaldehyde Content: Certified by Scientific Certification Systems to be made without use of phenol formaldehyde and to contain not more than 0.05 ppm formaldehyde.

6. Force to Withdraw Screws at Panel Face: 225 pounds minimum, No.10 sheet metal screw.

7. Force to Withdraw Screws at Panel Edge: 200 pounds minimum, No.10 sheet metal screw.

8. Recycled Wood Content: Certified by Scientific Certification Systems for pre-consumer recycled wood fiber content

D. Medium Density Fiberboard (MDF) Panels - Moisture Resistant Types, Provide at Sinks and Interior High Moisture Areas including installations in wieght room and dance room in building G: ANSI A208.2, Grade 155. No added formaldehyde, SierraPine Medex MDF as follows;

1. Meet all requirements specified above for Medium Density Fiberboard (MDF) Panels and the following:

a. Moisture-Resistant Panels: Withstanding the Accelerated Aging Tests specified in ASTM D 1037 without adverse effects.

2.07 LAMINATE MATERIALS

A. Manufacturers:

1. Formica Corporation: www.formica.com/#sle.

2. Wilsonart International, Inc[<>]: www.wilsonart.com.

3. Panolam Industries International, Inc: www.panolam.com/#sle.

4. Substitutions: See Section 01 6000 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

C. Provide specific types as indicated.

1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, color as selected, finish as selected.

2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, ____ color, finish as indicated.

3. Post-Formed Horizontal Surfaces: HGP, 0.039 inch nominal thickness, through color, color as selected, finish as indicated.

4. Post-Formed Vertical Surfaces: VGP, 0.028 inch nominal thickness, through color, color as selected, finish as indicated.

5. Flame Retardant Surfaces: HGF, 0.048 inch nominal thickness, through color, color as selected, finish as indicated.

6. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, ____ color, finish as indicated.

7. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

D. Colors, Patterns, and Finishes: As selected by Architect for manufacturer’s full range of standard and premium colors and patterns, and as follows:

1. Allow for different patterns and colors of base cabinet, upper cabinet and countertops in each building.

2. Allow for different color scheme combination for each building.

2.08 COUNTERTOPS

A. General: Types specified in Section 12 3600. Provide in accordance with WI Manual Sections cited to match quality grade(s) for cabinets indicated in this Section.

2.09 ACCESSORIES

A. Adhesive: Type recommended by WI to suit application, urea formaldehyde-free.

1. Wood Glue: Waterproof types as recommended by WI standards for the particular application. VOC content of not more than 30 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24.

2. Adhesive for Bonding Plastic Laminate: Contact cement, for general use and for postforming. Use unpigmented product with through-color laminate.

B. Plastic Edge Banding: Extruded PVC, flat shaped; smooth finish; self locking serrated tongue; of width to match component thickness. 3 mm thick, minimum.

1. Color: As selected by Architect from manufacturer's full range.

a. Provide minimum of twenty-five color selections coordinated with plastic laminate selections, including patterns and woodgrains.

C. Glass Shelves and Cabinet Door Inserts: Tempered Float Glass, ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear) or obscure type as indicated, Quality-Q3, with exposed edges seamed before tempering, 6 mm thick minimum and thicker as indicated on drawings, permanently marked with certification label of the Safety Glazing Certification Council or another certification agency or manufacturer acceptable to authorities having jurisdiction.

D. Fasteners: Size and type to suit application.

E. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

F. Concealed Joint Fasteners: Threaded steel.

G. Grommets: plastic material for cut-outs, 2 inch diameter minimum, color as selected.

2.10 HARDWARE

A. General: Meet or exceed specified requirements of AWI/AWMAC/WI - Architectural Woodwork Standards (AWS) and BHMA Grade 1; US 26D finish or as selected by Architect from manufacturer's standards.

B. Shelf Support Clips: Plated steel, ANSI/BHMA A156.9, meet or exceed Grade 1 B04013, with support pin for drilled hole in cabinet standard and shelf, with pre-drilled hole for seismic fastener to shelf. Hettich Sekura #1, US Futaba 72511 52 068, or equal. Plastic clips will be rejected.

C. Workstation and Countertop Brackets: Type specified in Section 12 3600.

D. Door and Drawer Pulls: Provide at all doors and drawers, matte stainless steel, 6-5/16 inch hole spacing x 1-13/32 inch loop wire pull complying with CBC 11B-309..4; Mockett DP57D, www.mockett.com or equal .

E. Cabinet Locks: Provide at all cabinets and drawers except sink cabinets. Locks to be keyed cylinder, two keys per lock, master keyed, steel with chrome finish.

F. Catches: Magnetic.

G. Drawer Slides:

1. Type: Extension types as indicated.

2. Static Load Capacity: Heavy Duty grade and minimum capacity ratings as follows;

a. File Drawers: Extra Heavy Duty grade 125 pounds.

b. Lateral File Drawers: Extra Heavy Duty grade 150 pounds.

c. Lateral File Drawers More Than 30" Wide: Extra Heavy Duty grade 200 pounds.

d. Drawers in excess of 36 inches wide: Extra Heavy Duty grade 150 pounds.

e. Pencil Drawers (less than 4 inches inside height): 50 pounds.

f. All other drawers: 75 pounds.

3. Mounting: Side mounted.

4. Stops: Integral type.

5. Features: Provide self closing/stay closed type.

6. Manufacturers:

a. Accuride International, Inc; Heavy-Duty Drawer Slides: www.accuride.com/#sle.

b. Grass America Inc; Ball Bearing Slide System: www.grassusa.com/#sle.

c. Hettich America, LP: www.hettich.com/#sle.

d. Knape & Vogt Manufacturing Company: www.knapeandvogt.com/#sle.

e. Substitutions: See Section 01 6000 - Product Requirements.

H. Hinges: Stainless steel, five knuckle ANSI / BHMA Grade 1, non-removable pins, attached with screws that are inaccessible when closed, capable of 270 degree swing. Finish as selected by Architect. European style concealed hinges will be rejected.

1. Manufacturer: Rockford Process Control "No. 376" or equal.

2. Substitutions: See Section 01 6000 - Product Requirements.

I. Latches: Finger-release type; Locate release not exceeding 40 inches above finish floor elevation, on either leaf of pair doors, to suit configurations shown.

J. Grommets and covers: 2 inch diameter, ABS plastic; color as selected.

K. File frames and followers: Pendaflex type at each drawer indicated as file drawer.

L. Other Hardware: per referenced standard.

2.11 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

1. Cap exposed plastic laminate countertop finish ends and edges with material of same finish and pattern. Cap semi-exposed ends and edges with materials permitted by the Referenced Standard. Plastic Tee banding is not acceptable.

2. Plastic Laminate Faced Cabinet Edge Band: 3mm PVC at doors, drawer fronts, false fronts, and at all other edges requiring banding.

3. Wood Faced Cabinet Edge Band: 3mm wood edge band at doors, drawer fronts and false fronts, all other edges per the AWS.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 6 feet from sink cut-outs.

E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Seal cut edges.

2.12 FABRICATION - COUNTERTOPS

A. Fabricate countertops as specified in Section 12 3600 and to match quality grade standards specified in this section. In the event of conflict, the higher standard prevails.

2.13 SOURCE QUALITY CONTROL

A. Labels: Certification of compliance, affixed by WI Inspector at the place of fabrication prior to shipment.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify location of blocking, adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure casework in place; rigid, plumb, and level, free of distortions. Shim as required; use concealed shims.

B. Use fixture attachments in concealed locations wherever possible for wall mounted components. Exposed fasteners at semi-exposed surfaces and exposed interior surfaces are acceptable when required to provide a seismic compliant installation.

1. Exception: Exposed fastening permitted at access panels.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other work, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinets to floors and walls using appropriate angles and anchorages.

F. Shelves: Install adjustable shelves evenly spaced, with specified hardware. Securely attach shelves to earthquake clips.

G. Countertops: Anchor securely to base units and other support systems and as specified in Section 12 3600.

H. Connection of sinks to plumbing systems as specified in pertinent related sections.

3.03 TOLERANCES.

A. Site Tolerances: 1/8 inch in 8 feet for plumb and level; adjoining surfaces flush, without offset.

B. Cabinet Tolerances: As specified in the referenced standard.

3.04 ADJUSTING

A. Adjust installed work.

1. Adjust and lubricate moving or operating parts to function smoothly and correctly.

2. Adjust hardware to center doors and drawers in openings and to provide smooth operation.

B. Touch-up shop-applied finishes to restore damaged or soiled areas.

C. Repair damaged and defective woodwork and eliminate defects functionally and visually. Where repair is not possible replace woodwork. Adjust joinery for uniform appearance.

3.05 FIELD QUALITY CONTROL

A. If Architect questions that installation quality may not conform to the specified AWS Quality Grade, Architect may order a final inspection by a WI Inspector.

3.06 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

3.07 PROTECTION OF FINISHED WORK

A. Do not permit finished casework to be exposed to continued construction activity.

B. Do not store materials or products on countertops. Do not stand or walk on countertops or use for construction access to building elements above floor level.

C. Protect countertops with durable panel materials secured in place using methods which will not damage surfaces or finishes. Do not remove until Owner acceptance following move-in.

3.08 SCHEDULES

A. All Locations:

1. Quality: WI Custom Grade.

2. Cabinet Construction: Plastic laminate faced.

3. Countertops: Plastic laminate.

END OF SECTION

SECTION 07 0150

TPO ROOFING REPAIR

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Roofing Contractor shall supply all labor, equipment, temporary protection and tools for the proper installation and completion of the work as required in these specifications and in accordance with good roofing practice.

B. The following items are specified in this section:
1. Insulation.
2. Fasteners.
3. Roof membrane & traffic pads..
4. Roof membrane flashings.
5. Treated wood.
6. Sealants.

C. Related Sections
1. Section 06100 – Rough Carpentry
2. Section 07900 – Joint Sealers
3. Division 15 – Mechanical
4. Division 16 – Electrical

1.02 REFERENCES

A. American Society of Testing and Materials (ASTM)

B. A526 - Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality

C. D638 - Test Method for Tensile Properties of Plastic

D. D751 - Test Methods for Coated Fabrics

E. D1204 - Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

F. D2565 - Practice for Operating Xenon Arc-Type Light-Exposure Apparatus with and without Water for Exposure of Plastics

G. D4434 - Specification for Poly (Vinyl Chloride) Sheet Roofing

H. SUBMITTALS

I. Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with the specified requirements.

J. Material Safety Data Sheets (MSDS): Submit MSDS for membranes, insulation, adhesives, and sealants.

K. Submit written approval of the insulation manufacturer for use of the product in the proposed system.

L. Submit specimen copy of the membrane manufacturer's warranty covering materials.

M. Submit specimen copy of the roofing contractor's warranty covering workmanship.

N. Submit dimensioned shop drawings which shall include:

O. An outline of the roof and roof size.

P. Proposed profile details of flashing methods for penetrations and terminations that differ from the detail drawings supplied in the Contract documents.

Q. Submit copies of ANSI/SPRI Pullout Test Reports A & B.

R. Submit written documentation from the manufacturer that the proposed roofing system including insulation and fasteners meets the applicable requirements and code approvals as referenced in this specification and that the roofing system meets the requirements for the manufacturer's standard warranty covering material.

S. Submit from membrane manufacturer a list of successful contractor personnel who have been trained to perform membrane welding. Membrane manufacturer also to submit approval of Contractor's welding equipment.

1.03 QUALITY ASSURANCE

A. This roofing system shall be applied only by an approved contractor authorized prior to bid by the roof membrane manufacturer.

B. Manufacturer’s Inspections: Membrane manufacturer’s representative will make jobsite inspections a minimum of three (3) days per week. Object shall be to keep the Architect and Owner appraised as to the progress and quality of the work being performed. Representative will provide inspection reports, including photographs, to the Architect, Inspector and Owner. Reports shall include any failure of the roofing contractor to correct errors or omissions of the manufacturer’s guidelines for product application. At the completion of the work, representative to provide letter indicating that contractor has installed roofing system per manufacturer’s application instructions, other than those items that may have been previously reported and corrected.

C. There shall be no deviation made from this specification or the approved shop drawings without prior written approval by the manufacturer.

D. Code Requirements: The proposed roofing system shall meet the requirements of the following recognized code approval or testing agencies. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in Article 1.03 "Submittals".

E. Underwriters Laboratories (U.L.) Class A membrane.

F. Factory Mutual (F.M.) I-90 uplift rating.

G. All products used shall not contain asbestos fibers.

1.04 DELIVERY, STORAGE AND HANDLING

A. All products delivered to the job site shall be in the original unopened container or wrappings.

B. Membrane rolls and insulation shall be stored lying down and fully protected from moisture and wind damage. Remove plastic from insulation and cover with canvas tarpaulins on raised platforms.
   1. Bonding adhesives shall be stored at temperatures above 40oF (4oC).

C. Handle all materials to prevent damage. Any materials which are determined damaged by the SDR are to be removed from the job site and replaced at no cost to Sandia National Laboratories (SNL).

1.05 JOB CONDITIONS

A. Construction may not be fully represented on the drawings, and some modifications to details may be required to accomplish the intent of the documents.

B. Contractor shall ascertain to his satisfaction, prior to bidding, that the specifications are workable and that they are not in conflict with the manufacturer's requirements for a material warranty.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks, and any damages shall be repaired or replaced at no cost to Owner. All exterior lighting, equipment, landscaping and paving shall be protected from damage.

D. Contractor shall test drains per General Contractor’s direction prior to and upon completion of roofing work to ensure that no blockage exists or has occurred.

E. Only as much of the new roofing as can be made weathertight each day including all flashing work, shall be installed. Plug all roof drains before starting work each day and unplug all drains at the end of each workday.

F. All surfaces to receive insulation, membrane or flashing shall be thoroughly clean and dry. Should surface moisture occur, the contractor shall provide the necessary equipment and labor to dry the surface prior to application.

G. All construction, including equipment and accessories, shall be secured against wind blow-off damage.

H. Temporary water stops shall be installed at the end of each day's work and shall be removed before proceeding with the next day's work. Water stops shall be compatible with all materials, shall not emit dangerous or incompatible fumes, and shall be installed per manufacturer's recommendations unless specified per details shown on Contract drawings.

I. Contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. Plywood protection shall be provided for all new and existing roof areas which receive traffic during construction. Damaged membrane will be replaced at no cost to Owner.

J. Prior to and during applications, all dirt, debris and dust shall be removed from surfaces either by sweeping or vacuuming. Compressed air is prohibited.

K. Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks and excessive heat.

L. Membranes and accessories shall not be exposed to a prolonged temperature in excess of 160oF (71oC).

M. Contaminants, such as grease, fats, oils and solvents shall not be allowed to come into direct contact with the roofing membrane. Any exposures shall be presented to the membrane manufacturer for assessment of impact on the roof system performance. If material is found to be damaged, the Contractor shall replace materials at no cost to SNL.

N. Site clean-up, including both interior and exterior building areas below or adjacent to or in any way affected by the construction of the roof, shall be complete and to the Owner’s

satisfaction. Cleaning of the membrane with gasoline is prohibited. Mineral spirits shall be used to clean tar or asphalt from the membrane. Notify the Owner before using any solvent or cleaner to allow intake fans to be shut down.

O. All roofing, insulation, flashings, and metal work removed for construction shall be promptly taken off the site to a legal dumping area.

P. Contractor shall take care during application and storage to ensure that overloading of the deck and structure does not occur.

Q. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Coordinate closing or shut-offs of vents and air intakes during roofing and flashing operations.

1.06 WARRANTY

A. Upon completion of the work and receipt of final payment, the manufacturer's fifteen (15) year warranty covering materials shall be issued to the Owner. Warranty shall be a composite single ply/standing seam metal/metal wall panel warranty. The same manufacturer shall supply the single ply, standing seam metal, and metal wall panels to provide the Owner with a single source of liability against leaks for the length of the applicable warranty period.

B. Roofing contractor shall supply manufacturer with a minimum four-year workmanship warranty. In the event any work related to roofing, flashings, or metalwork is found to be defective or otherwise not in accordance with the contract documents within four years of final acceptance, the roofing contractor shall remove and replace the defects at no cost to the Owner.

1. C. Manufacturer to provide annual roof inspections free of charge for the length of the warranty period. At every 5th year, inspections to include roof maintenance report with scope of work provided to the Owner to keep the roof watertight.

PART 2 PRODUCTS

2.01 APPROVED MEMBRANE SYSTEMS

A. Specification based on performance characteristics of Seal Tite, TPO Membrane, as provided by Commercial Innovations, a subsidiary of The Garland Company and form the basis of the contract documents. Any proposed alternate systems must meet or exceed all of the performance characteristics, code and warranty requirements and manufacturer's site inspection requirements as listed in this specification. For proposed alternate systems, provide letter of certification, signed by an Officer of the company, that proposed system meets all of the criteria as listed in this specification.

2.02 MEMBRANE

A. TPO: Roofing membrane shall be a single ply thermoplastic polyolefin (TPO) sheet membrane conforming to the following minimum physical properties:

B. Mechanically Attached System

C.	Property	ASTM Test Method	Specification
D.	White *		
E.	Code Listing	UL790	Class A
F.	Breaking Strength	D751	200 lbf min.
G.	Elongation @ break,%	D412	500% Min.

H.	Thickness, minimum	D638	0.060 inch (60 mils)
I.	Accelerated Weathering	D2565	10,000 hours
J.	Water Absorption	D570	2.0% max.
K.	Tear Resistance	D751B	55 lbs. min.

L. * White color meets State of Ca., Title 24 requirements.

M. Seaming: Heat welded.

N. Solvent: Solvent seam cleaning solution as recommended by manufacturer.

O. 4. Caulk: Solvent-based ethylene propylene seam caulk provided by manufacturer.

P. 5. Membrane Fasteners & Discs: As recommended by roofing manufacturer for securing membrane to deck surface.

2.03 FLASHING MEMBRANE

A. Flashing membrane shall be as supplied by the roofing membrane manufacturer. Flashing metal shall be 0.023" galvanized steel laminated to 0.020" of roofing membrane used for flashings and edge metal detailing.

B. Termination Bar: Extruded aluminum bar 0.08" thick x 1" wide for use in terminating adhered reinforced membrane base flashings as required.

2.04 INSULATION

A. General: Provide insulating materials to comply with requirements indicated for materials and compliance with referenced standards; in size to fit applications, select from the manufacturer's standard thicknesses, widths and lengths.

B. Polyisocyanurate Board Roof Insulation: Rigid, cellular thermal insulation with polyisocyanurate closed-cell foam core and manufacturer's standard facing laminated to both sides. Provide in two layers for a total thickness to meet a minimum aged R-Value of 19.0, unless indicated elsewhere on the Contract drawings. R-Max Multi-Max FA or equal.

C. All insulations must comply with previously stated requirements of Factory Mutual and Underwriters Laboratories.

D. Insulation and fasteners shall be supplied or approved by the membrane manufacturer for compatibility with the roof system.

2.05 ACCESSORY PRODUCTS

A. Flashing Adhesive: As specified by the membrane manufacturer. All adhesives containing carcinogens shall be limited to vertical surfaces and flashings.

B. Walkway Pads: Membrane manufacturer's walkway material, color selected by Architect. Location shall be as shown on the drawings. Verify manufacturer's standards for walkway pad design and slip resistance and include with Shop Drawings.

C. Wood Nailers: treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on the Contract drawings. Wood shall be #2 or better lumber, and "wolmanized" or pressure-treated for fire and rot resistance. Creosote and asphaltic preservatives are prohibited. Height of nailers shall match that of the insulation thickness or as indicated on the drawings. Nailers shall be firmly anchored at a maximum spacing of 12 inches (305 mm) unless noted otherwise on drawings

and capable of resisting a force of 175 pounds per lineal foot (260 kg per meter) in any direction. One-half inch (13 mm) expansion spaces shall be provided between lengths of nailers.

D. Sealants: As recommended by the membrane manufacturer.

E. Miscellaneous Fasteners and Anchors: In general, all fasteners, anchors, nails and straps shall be of zinc-coated steel, galvanized, or stainless steel, and cadmium-free. All fasteners and anchors shall have a minimum embedment of 1-1/2 inch (38 mm) and shall be approved for such use by the fastener manufacturer and the membrane manufacturer.

F. Sheet Metal Accessory Materials: ASTM A526, with 0.20% copper, G90 hot-dipped galvanized, 24 gage (0.61 mm) or heavier.

G. Expansion Joint Covers: Shall be the manufacturer's prefabricated units of the same material as the roof membrane.

H. Perimeter Edge Metal: Shall be supplied by the membrane manufacturer and coated with the same material as the roofing membrane.

PART 3 EXECUTION

3.01 INSPECTION

A. Prior to all work of this section, Contractor shall carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B. Verify that work of other trades that penetrate the roof deck has been completed.

C. Verify that roofing system may be installed in strict accordance with all pertinent codes and regulations, the original design and the manufacturer's recommendations.

3.02 DISCREPANCIES

A. In the event of discrepancy, immediately notify the Architect and Inspector.

B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.03 PREPARATION OF SUBSTRATE

A. General: Comply with the insulation and membrane manufacturer's instructions for preparation of the substrate to receive the roofing system.

B. Clean substrate of dust, debris, and other substances detrimental to the system work. Remove sharp projections.

C. Notify the Roofing Manufacturer to inspect the substrate. Contractor shall not proceed with installation until the manufacturer has approved the substrate.

3.04 INSULATION INSTALLATION

A. Insulation shall be installed according to the insulation manufacturer's instructions and shall be approved by the Architect and membrane manufacturer.

B. Insulation shall be neatly cut to fit around all penetrations and projections.

C. Install tapered insulation where applicable in accordance with insulation manufacturer's approved shop drawings.

D. Install tapered insulation around drains creating a drain sump.

E. Do not install more insulation board than can be covered with membrane by the end of the day, or onset of inclement weather.

F. Attachment:

G. Insulation shall be mechanically fastened or fully adhered to the deck with approved fasteners and plates or adhesives at a rate and pattern acceptable to Factory Mutual's and membrane manufacturer's requirements for fastening rates and patterns.

H. Fasteners and adhesives are to be installed in accordance with the manufacturer's recommendations. Fasteners are to have a minimum penetration into the structural deck as recommended by the fastener manufacturer and membrane manufacturer.

I. Perform pull out tests for the Inspector and Manufacturer to verify deck conditions and actual pull out values prior to installation of the membrane.

J. Use fastener tools with a depth locator as recommended or supplied by the fastener manufacturer to ensure proper installation.

3.05 INSTALLATION OF MEMBRANE

A. Surface of the insulation shall be inspected prior to installation of the roof membrane. The insulation surface shall be clean and smooth with no excessive surface roughness, contaminated surfaces, or unsound surfaces such as broken or delaminated insulation boards.

B. Membrane shall be installed per the membrane manufacturer's written installation procedures and approved Shop Drawings.

C. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching. Allow the membrane to relax at least 15 minutes when the temperature is above 60 degrees F, or 30 minutes for lower temperatures prior to installation. Inspect for damage. Remove sections of membrane that are creased or damaged. Lap sheets as recommended by manufacturer depending on fastening method to be used.

D. Overlap edges and ends and seal by 1 ½" heat weld. Seal permanently to provide a minimum 1 ½" continuous waterproof welded seam. Apply uniform bead of sealant, furnished by manufacturer, to joint edge, cut edge, end lap or 'T' joints.

E. In-Lap Fastening: At perimeter where walls do not exceed 24" in height, install minimum 2(two) half sheets parallel with the perimeter and fasten at the pre-determined spacing in the lap area in a line centered approximately 1 ½" from the edge of the sheet leaving 1 /2" of membrane outside the disc. Weld lap area to metal base flashing continuously a minimum of 1 ½" weld width.
   1. For Field Areas: Membrane shall run perpendicular to the orientation of decks. Install membrane overlaps to facilitate the flow of water. Shingle joints on sloped substrate in direction of drainage. Overlap membrane sheets a minimum 4 ½" to provide space for fastener and disc placement and for a continuous 1 ½" width weld. .

F. All completed seams shall be checked by the Contractor for continuity and integrity using a screwdriver or suitable blunt instrument. In addition, on-site evaluation of welded seams shall be made daily by the Contractor to locations as directed by the Inspector or membrane manufacturer's representative. Contractor shall provide 2-inch (51 mm) wide cross-sectional samples taken through completed seams. Approximately two samples will be taken per 100 roofing squares. Each test shall be patched by the Contractor at no charge to Owner.

3.06 TEMPORARY CUTOFF

A. All flashing shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. When a break in the day's work occurs in the central area of the roof, a temporary water stop shall be constructed to provide a 100% watertight seal. The water stop shall be installed per the manufacturer's recommendations unless otherwise specified per details shown on the Contract drawings. When work on the new system is suspended, the stagger of the insulation joints shall be maintained by installing partial fillers. The new membrane shall be carried into the water stop. When work resumes, the contaminated membrane, insulation fillers, etc., shall be removed from the work area and disposed of off-site. None of these materials shall be reused in the new work.

B. If inclement weather occurs while a temporary water stop is in place, the Contractor shall provide the labor necessary to monitor the situation to maintain a watertight condition.

3.07 MEMBRANE FLASHINGS

A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary membrane flashings shall be allowed without the prior written approval of the membrane manufacturer. Approval shall only be for specific locations on specific dates.

B. All flashing membranes shall be fully adhered to substrates. All base flashings to extend a minimum 8" up vertical surfaces. Coated metal flashings and terminations shall be securely fastened in the plane of the roof deck with fasteners recommended by the membrane manufacturer.

C. All coated metal flashings shall be installed per manufacturer's instructions. Complete metal work concurrently with roofing and flashings so that a water tight condition exists daily. Install TPO coated metal to provide adequate resistance to bending and to allow for normal thermal expansion and contraction.

D. Fasteners and roofing nails used to secure flashings to wood nailers shall be stainless steel, galvanized metal or other corrosion resistant material. Shall penetrate into wood nailer minimum ¾". Pipe penetrations shall be flashed a minimum of 8 inches above the roofing membrane.

E. Wall flashings are not to exceed 24" whenever possible. At wall conditions above 24", install R-Mer Lite metal wall panels as manufactured by The Garland Company. Wall panels to be direct fastened to substrate with butyl tape and fasteners as per the manufacturer's instructions.

F. Fabricate coated metal with hemmed edges to prevent sharp metal edges from cutting the membrane, except when in conjunction with wood nailers.

3.08 COMPLETION

A. Prior to demobilization from the site, the work shall be reviewed by the SDR and Contractor. All defects or non-compliance with these specifications or the recommendations of the membrane manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Contractor prior to demobilization to the satisfaction of the SDR and the membrane manufacturer.

END OF SECTION

SECTION 07 2100
BOARD AND BATT (BUILDING) INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation and vapor retarder in interior and exterior wall and ceiling construction.

B. Insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 07 8400 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.

D. Division 23 - Mechanical, Duct and Pipe Insulation.

1.03 REFERENCE STANDARDS

A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C.

D. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code.

E. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

F. Manufacturer's recommendations.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. CAL-GREEN Submittals:

1. Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

2. Certify compliance with California Referenced Standards Code as referenced in Article PERFORMANCE REQUIREMENTS.

D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

E. Schedule of installation methods for each and every system and condition.

F. Samples of mechanical supports and fasteners.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.06 SEQUENCING

A. Sequence work to ensure fireproofing and firestop materials are in place before beginning work of this section.

1.07 DELIVERY, STORAGE AND HANDLING

A. Mark materials on face of package, with manufacturer's name, thickness, and insulation “R “ value.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Insulating Material Standards: All insulation materials must comply with the California Referenced Standards Code, California Code of Regulations, Title 24, Part 12 / Chapter 12-13 Standards for Insulating Material.

1. Foam Board Insulation products shall be manufactured without HFC134a blowing agents.

C. Roof and wall insulation to provide a complete insulation envelope surrounding all conditioned spaces, as indicated elsewhere in the Contract Documents, and as listed below.

2.02 APPLICATIONS

A. Insulation in Wood Framed Exterior Walls: Batt insulation with integral vapor retarder.

1. Wood Framed Wall Insulation: Minimum R-19 fiberglass batts with vapor retarder facing, fastened to wood studs, and greater thicknesses as required to fill framing cavity with insulation batt equal to full depth of framing member.

B. Insulation in Interior Framed Walls: Unfaced Batt Insulation with no vapor retarder to full depth of framing member, at all wall locations.

2.03 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulations

1. Glass Fiber Batt Insulation: ASTM C 665; flexible preformed glass fiber batt; friction fit, sized to fit between framing elements, conforming to the following:

a. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.

b. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

c. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.

d. Formaldehyde Content: Zero.

e. Thermal Resistance: R value as indicated.

f. Facing: FSK (Foil-Scrim Kraft), one side. Exception: Paper facing may be provided in locations where the insulation is in "substantial contact" with the wall finish as described in exceptions noted in CBC 719.2.1.

g. Maximum 0.50 perm rating, ASTM E 96.

h. Manufacturers:

1) Johns Manville International, Inc: www.jm.com.

2) CertainTeed Corporation: www.certainteed.com.

3) Owens Corning Corp: www.owenscorning.com.

4) Substitutions: See Section 01 6000 - Product Requirements.

2. Acoustic Batt (Sound Retardant) Glass Fiber Insulation:

a. Same as Batt Insulation, unfaced.

2.04 OTHER INSULATION

A. Foamed-in-place Plastic Insulation: Polyurethane Foam Sealant, Flame Spread 20 / Smoke Developed 20, when tested in accordance with ASTM E 84.

1. Manufacturers:

a. Dow Chemical Co.; Great Stuff: www.itsgreatstuff.dow.com. UL Listed R 13655.

b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES

A. Attachment clips as recommended by the manufacturer in writing.

B. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.

C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

D. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

E. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify that all framing inspections are complete and that required corrections have been made before installing insulation.

3.02 INSTALLATION - GENERAL

A. Install insulation in accordance with manufacturer's instructions.

B. Install in walls, roof and ceiling spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.

D. Small gaps and voids which are not otherwise insulatable:

1. Either sprayed foam type plastic insulation or mineral wool, as recommended by the Contractor and approved by the Architect.

2. Provide bond breaking material between foam and adjacent materials whereever possible.

E. Install with factory applied vapor retarder membrane facing warm side of building spaces.

3.03 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall, roof, and ceiling spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. At exteior walls, install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.

F. Secure vapor barrier facing to framing along edges and at ends of batt at all applications. At horizontal applications additionally provide guy wire or netting to support insulation without sags.

G. Batts: Attach by either method.

1. Install as a single length between structural members or fold vapor barriers together and staple or tape at intermediate end joints.

2. Staple or nail facing flanges in place at maximum 6 inches on center.

H. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

I. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over member face.

J. Tape seal tears or cuts in vapor retarder.

K. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

L. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

3.04 PROTECTION

A. Repair holes or tears with adhesive tape immediately before application of finish.

B. Do not permit installed insulation to become wet or damaged prior to its concealment.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

B. Pertinent Sections specifying sealants or referencing this Section for sealant products and execution requirements.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.

B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.

C. ASTM C834 - Standard Specification for Latex Sealants.

D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.

G. ASTM C1193 - Standard Guide for Use of Joint Sealants.

H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.

I. ASTM C1311 - Standard Specification for Solvent Release Sealants.

J. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

K. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

L. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness.

M. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

N. Manufacturer's recommendations and specifications.

O. SWRI (VAL) - SWR Institute Validated Products Directory.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
   6. Substrates for which laboratory adhesion and/or compatibility testing is required.
   7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   8. Sample product warranty.
   9. Certification by manufacturer indicating that product complies with specification requirements.
   10. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
   1. Manufacturer's Installation Instructions: Indicate limitations, special procedures, surface preparation, and perimeter conditions requiring special attention.
   2. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

D. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant colors (multiple colors will be required).

E. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

G. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

H. Sustainable Design Documentation: For sealants and primers, submit VOC content and emissions documentation as specified in Section 01 6116.

I. Manufacturer Qualifications. Demonstrate compliance with specified requirements.

J. Installer Qualifications. Demonstrate compliance with specified requirements.

K. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

L. Installation Plan: Submit at least four weeks prior to start of installation.

M. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

N. Field Quality Control Plan: Submit at least two weeks prior to start of installation.

O. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

P. Installation Log: Submit filled out log for each length or instance of sealant installed.

Q. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

D. Manufacturer of sealant and caulking material to certify that cleaners, joint filler or bond breakers, and primers, for a particular application, are compatible with sealant.

E. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   1. Adhesion Testing: In accordance with ASTM C794.
   2. Compatibility Testing: In accordance with ASTM C1087.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver to manufacturer sufficient samples for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

F. Installation Plan: Include schedule of sealed joints, including the following.
   1. Joint width indicated in Contract Documents.
   2. Joint depth indicated in Contract Documents; to face of backing material at centerline of joint.
   3. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
   4. Approximate date of installation, for evaluation of thermal movement influence.
   5. Installation Log Form: Include the following data fields, with known information filled out.
      a. Location on project.
      b. Substrates.
      c. Sealant used.

d. Primer to be used, or indicate as "No primer" used.
e. Size and actual backing material used.
f. Date of installation.
g. Name of installer.
h. Actual joint width; provide space to indicate maximum and minimum width.
i. Actual joint depth to face of backing material at centerline of joint.
j. Air temperature.

G. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
1. Identification of testing agency.
2. Name(s) of sealant manufacturers' field representatives who will be observing
3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
b. Test date.
c. Location on project.
d. Sealant used.
e. Stated movement capability of sealant.
f. Test method used.
g. Date of installation of field sample to be tested.
h. Date of test.
i. Copy of test method documents.
j. Age of sealant upon date of testing.
k. Test results, modeled after the sample form in the test method document.
l. Indicate use of photographic record of test.

H. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 24 inches thereafter.
b. If any failures occur in the first 10 linear feet, continue testing at 12 inch intervals at no extra cost to Owner.
3. Destructive field adhesion testing of sealant joints, except interior acrylic latex sealant.
a. For each different sealant and substrate combination, allow for one test every 100 feet in the first 1000 linear feet, and one test per 1000 linear feet thereafter, or once per floor on each elevation.
b. If any failures occur in the first 1000 linear feet, continue testing at frequency of one test per 500 linear feet at no extra cost to Owner.
4. Field testing agency's qualifications.
5. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

I. Field Adhesion Test Procedures:
1. Allow sealants to fully cure as recommended by manufacturer before testing.
2. Have a copy of the test method document available during tests.

3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

J. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
1. Record results on Field Quality Control Log.
2. Repair failed portions of joints.

K. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inch long.
2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.
4. Record results on Field Quality Control Log.
5. Repair failed portions of joints.

1.06 MOCK-UP

A. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

B. Construct mock-up with specified sealant types and with other components noted.

C. Locate where directed.

D. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01 6000.

B. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

C. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.08 FIELD CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
   2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.09 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Building envelope:
      a. Make watertight and weathertight without causing staining or deterioration of joint substrates.
      b. Exterior work that does not remain watertight and all work which does not retain all properties inherent in the product as stipulated by the manufacturer will be considered faulty.

B. Building Exterior and Interior:
   1. Seal the following joints with joint sealer:
      a. Expansion and control joints in exterior walls, copings, parapets.
      b. Expansion and control joints in interior concrete slab floors.
      c. Joints between metal panels.
      d. Joints between door and window frames and adjacent materials.
      e. Joints between cabinets and countertops and walls.
      f. Control joints in interior partitions, including portion above ceilings.
      g. Expansion and control joints in solid exterior soffits.
      h. Control joints in interior ceilings and soffits.
   2. Apply continuous bead of joint sealer in the following locations during installation of materials specified elsewhere:
      a. In lap joints of sheet metal construction.
      b. Roofing panels and roof-related sheet metal and flashing.
      c. Between partition floor and ceiling tracks and adjacent construction.

d. Between end stud of partition and adjacent construction.
e. Under door sills.

3. Acoustic Sealants at acoustic separations shall make assembly airtight.
   a. Seal perimeter and intersections of finish.
   b. Seal around electrical boxes and other penetrations of finish; seal holes within electrical boxes; seal conduit ends.
   c. Seal pipes which penetrate acoustic separations.
4. Joints not specifically mentioned above which require sealants to meet the performance criteria cited in this section.

2.02 MATERIALS

A. Sealants and Primers - General: Provide products having volatile organic compound (VOC) content as specified in Section 01 6116.

B. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors: Provide color of exposed joint sealants to comply with the following:
   1. Provide colors matching selections made by Architect from manufacturer's full range of colors for products of type indicated. Colors may be listed in schedule at the end of this section or on the drawings. Request color selection for all products listed without a preselected color.

2.03 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
      c. Other joints indicated below.
   3. Do not seal the following types of joints.

a. Intentional weepholes in masonry.
b. Intentional weepholes in window assemblies and head flashings.
c. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
d. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
e. Joints where installation of sealant is specified in another section.
f. Joints between suspended panel ceilings/grid and walls.

B. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.04 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 6116.

B. Colors: As indicated on the drawings. If no colors are indicated, request colors before preparation of schedule submittals and include on all schedule submittals.

2.05 NONSAG SILICONE JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
5. Color: To be selected by Architect from manufacturer's standard range.
6. Service Temperature Range: Minus 20 to 180 degrees F.
7. Manufacturers:
a. Dow Chemical Company; DOWSIL 790 Silicone Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
b. Pecora Corporation: www.pecora.com/#sle.
c. Sika Corporation; Sikasil WS-290: www.usa-sika.com/#sle.
d. Substitutions: See Section 01 6000 - Product Requirements.

B. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Cure Type: Single-component, neutral moisture curing
5. Service Temperature Range: Minus 65 to 180 degrees F.
6. Manufacturers:
a. Dow Corning Corporation; 795: www.dowcorning.com.
b. Sika Corporation; Sikasil WS-295: www.usa-sika.com/#sle.
c. Substitutions: See Section 01 6000 - Product Requirements.

C. Silicone Sealant: ASTM C920, Type S, Grade NS, Class 25, single component, neutral curing, non-sagging, non-staining, non-bleeding, RTV silicone designed for adhesion to low energy surfaces common in sheet or peel-and-stick flexible flashings and air/weather barriers.
1. Color: To be selected by Architect from manufacturer's standard range.

2. Service Temperature Range: -65 to 180 degrees F.
3. Products:
   a. Dow Corning Corporation; 758: www.dowcorning.com.
   b. Sika Corporation, Construction Products Division; Sikasil-N.
   c. Substitutions: See Section 01 6000 - Product Requirements.

D. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A, Class 25; Use NT, A, and O, single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: White.
2. Manufacturers:
   a. Master Builders; Omniplus: www.master-builders-solutions.com.
   b. Dow Corning Corporation; 786-M White.
   c. GE Construction Sealants; SCS1700 Sanitary.
   d. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.
   e. Sika Corporation; Sikasil GP: www.usa-sika.com/#sle.
   f. Substitutions: See Section 01 6000 - Product Requirements.

2.06 URETHANE NON-SAG SEALANTS

A. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 35 percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: Custom as selected..
4. Manufacturers:
   a. Master Builders Solutions; www.master-builders-solutions.com, MasterSeal (Sonolastic) NP-2.
   b. Sika Corporation; Sikaflex-2c NS: www.usa-sika.com/#sle.
   c. Substitutions: See Section 01 6000 - Product Requirements.

B. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Products:
   a. Master Builders Solutions; www.master-builders-solutions.com, MasterSeal (Sonolastic) NP-1.
   b. Sika Corporation; Sikaflex-1a: www.usa-sika.com.
   c. Substitutions: See Section 01 6000 - Product Requirements.

2.07 ACRYLIC LATEX JOINT SEALANTS

A. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use, paintable.
1. Color: To be selected by Architect from manufacturer's standard range.
2. Manufacturers:
   a. Master Builders Solutions; MasterSeal NP 520 (Sonolac): www.master-builders-solutions.com.
   b. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.

c. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
d. Substitutions: See Section 01 6000 - Product Requirements.

B. Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
1. Color: To be selected by Architect from manufacturer's standard range.
2. Manufacturers:
a. Bostik Inc.; Chem-Calk 300.
b. Pecora Corporation; Pecora BC-158 Butyl Rubber Sealant: www.pecora.com/#sle.
c. Sherwin-Williams Company; Storm Blaster All Season Sealant: www.sherwin-williams.com/#sle.
d. Substitutions: See Section 01 6000 - Product Requirements.

C. Non-Curing Butyl Sealant: Solvent-based, single component, non-sag, non-skinning, non-hardening, non-bleeding; non-vapor-permeable; intended for fully concealed applications.
1. Manufacturers:
a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: www.pecora.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

D. Type - Acoustical Sealant: Acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning, ASTM C-834, nonsag, paintable, nonstaining latex sealant. Effectively reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Composition: Acrylic latex emulsion sealant.
2. Applications: Use for concealed locations only:
a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
b. Locations indicated and as required to meet acoustic requirements of walls and partitions.
3. Products:
a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant: www.pecora.com, at fire-rated construction.
b. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant: www.us.hilti.com.
c. Hilti, Inc.; CP 572 Smoke and Acoustical Spray Sealant: www.us.hilti.com.
d. Master Builders Solutions; MasterSeal NP 520: www.master-builders-solutions.com.
e. Substitutions: See Section 01 6000 - Product Requirements.

2.08 SELF-LEVELING SEALANTS

A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Color at colored concrete: Custom-mixed colors matching colored concrete floors or paving.
5. Service Temperature Range: Minus 40 to 180 degrees F.
6. Manufacturers:

a. Master Builder Solutions; MasterSeal (Sonolastic) SL 2 Slope Grade or Self Leveling Sealant: www.master-builders-solutions.com
b. Sika Corporation; Sikaflex-2c SL: www.usa-sika.com/#sle.
c. Substitutions: See Section 01 6000 - Product Requirements.

B. Concrete Paving Joint Sealant: Polyurethane, pourable self-leveling; ASTM C920, Class 25, Uses T, I, M and A; multi- component.
1. Color: Custom mixed color matching colored concrete.
2. Products:
a. Master Builders Solutions; MasterSeal (Sonolastic) SL-2: www.master-builders-solutions.com.
b. Pecora Corporation; Dyna-Trol II-SG: www.pecora.com.
c. Sika Corporation, Construction Products Division; Sikaflex 2C-SL.
d. Substitutions: See Section 01 6000 - Product Requirements.

C. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
1. Meet requirements of American Concrete Institute 302.1 R-04 "Guide for Concrete Floor and Slab Construction" and American Concrete Institute 360 R10 "Guide to Design of Slabs-on-Ground" for industrial floor joint fillers
2. Composition: Multi-component, 100 percent solids by weight.
3. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
4. Color: To be selected by Architect from manufacturer's standard colors.
5. Joint Width, Minimum: 1/8 inch.
6. Joint Width, Maximum: 1/4 inch.
7. Joint Depth: Provide product suitable for joints from 1/8 inch to 2 inches in depth including space for backer rod.
8. Manufacturers:
a. Euco 700 by The Euclid Chemical Company.
b. MM-80 by Metzger-McGuire.
c. Master Builders Solutions, MasterSeal CR 190: www.master-builders-solutions.com
d. W.R. Meadows, Inc; Rezi-Weld Flex: www.wrmeadows.com/#sle.
e. Substitutions: See Section 01 6000 - Product Requirements.

2.09 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
3. Open Cell: 40 to 50 percent larger in diameter than joint width.
4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

B. Tape Sealant: Double-sided rubber-backed butyl tape sealant, 35 mil thickness, adhesive strength 88 oz/in. Widths as required to suit application, black color. Grainger, www.grainger.com.
1. Substitutions: See Section 01 6000 - Product Requirements.

C. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

D. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

E. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

F. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
3. Arrange for sealant manufacturer's technical representative to be present during tests.
4. Record each test on Preinstallation Adhesion Test Log as indicated.
5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

I. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
   1. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
   2. Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise indicated.
   3. Provide flush joint configuration, per Figure 8B in ASTM C 1193, where indicated.
   4. Provide recessed joint configuration, per Figure 8C in ASTM C 1193, of recess depth and at locations indicated.
      a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

J. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.

C. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet, notify Architect immediately.

D. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

E. Repair destructive test location damage immediately after evaluation and recording of results.

3.05 FINISHING

A. Work that is exposed to view: Uniform surface with neat, straight edges and no excess material on adjacent surface.

3.06 CLEANING

A. Clean adjacent soiled surfaces.

3.07 PROTECTION

A. Protect sealants until cured. Replace damaged work with repairs indistinguishable from original work.

3.08 SCHEDULE

A. Architect will provide color selections and locations for each sealant type and for Contractor's use. Not all locations will have the same color.
   1. Custom colors will be required.

B. Exterior Locations:
   1. Joints which are bordered by glass: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
      a.
   2. Joints which are bordered by plastic: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
      a.
   3. Horizontal joints in sidewalks, decks, concrete floors, and driveways: Exterior or Interior Horizontal Expansion Joint Sealant - Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A;single component.
      a. At walk expansion joints.
      b. Where walks abut structural slabs or stoops.
      c. Where walks abut exterior wall of buildings.
      d. Where exposed interior concrete slabs abut vertical surfaces.
      e. Where sealant is shown on the Drawings for concrete slabs.
      f.
   4. Locations requiring adhesion to low energy surfaces common in sheet or peel-and-stick flexible flashings and air/weather barriers: ASTM C920, Type S, Grade NS, Class 25, single component, neutral curing, non-sagging, non-staining, non-bleeding, RTV silicone.
      a.
   5. Membrane Roofing Sealants: Types recommended by roofing manufacturer and complying with requirements of this section.
   6. Steep Slope Roofing Sealants: Types recommended by roofing manufacturer and complying with requirements of this section.
   7. Sheet Metal and Roof Accessory Sealants: Types recommended by roofing manufacturer and complying with requirements of this section.
   8. All other exterior joints including around perimeters of frames where door, window and louver frames abut concrete, masonry or other building materials (interior and exterior), Sills and thresholds, and at miscellaneous locations where sealant is shown on Drawings, exterior joints where no other sealant is indicated:
      a. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT, M, A and O; capable of 50% extension and compression movement.
      b. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
   9. Exterior Sheet Metal Lap Joints: Types recommended by manufacturer and complying with requirements of this section.
   10. Exterior Metal Panel Butt Joints and trim: Types recommended by manufacturer and complying with requirements of this section.

C. Interior Locations:
   1. Expansion and control joints, around perimeters of frames where door, window and louver frames abut concrete, masonry or other building materials, sills and thresholds, and at miscellaneous locations where sealant is shown on Drawings:

a. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT, M, A and O; capable of 50% extension and compression movement.
b. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

2. Interior Concrete Slabs on Grade:
   a. General Locations: Exterior or Interior Horizontal Expansion Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; single component.
3. Interior wet areas, around plumbing fixtures, countertops abutting walls, food service applications: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT, A and O.
4. Interior static dry joints as required to dress appearance, Other interior joints for which no other type of sealant is indicated.: Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
5. Where required for sound control: Acoustical Sealant, ASTM C-834.
6. Where required for sound control with limited flame spread: Acoustical Sealant, ASTM C-834, fire-rated type.

D. General:
1. Joints in construction between interior and exterior spaces and other designated or required locations to provide effective barrier against passage of elements, Other joints for which no other type of sealant is indicated.:
   a. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT, M, A and O; capable of 50% extension and compression movement.
   b. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
2. Specialty perimeters where required for appearance or weathertightness:
   a. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT, M, A and O; capable of 50% extension and compression movement.
   b. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

3.09 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Thermally insulated hollow metal doors with frames.

D. Accessories, including glazing and louvers.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 08 7100 - Door Hardware.

1.03 ABBREVIATIONS AND ACRONYMS

A. ANSI: American National Standards Institute.

B. HMMA: Hollow Metal Manufacturers Association.

C. NAAMM: National Association of Architectural Metal Manufacturers.

D. NFPA: National Fire Protection Association.

E. SDI: Steel Door Institute.

F. UL: Underwriters Laboratories.

1.04 DEFINITIONS

A. Exterior doors: Doors exposed in whole or in part to the weather.

B. Wet Areas: Exposed in whole or in part to areas where water is used in the room; toilets, custodial closets, food service, science classrooms, locker rooms and showers.

1.05 REFERENCE STANDARDS

A. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.

B. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

C. ADA Standards - 2010 ADA Standards for Accessible Design.

D. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.

E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).

F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

J. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

K. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

L. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

M. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.

N. ICC A117.1 - Accessible and Usable Buildings and Facilities.

O. NAAMM HHMA 820 - Guidelines for Glazing of Hollow Metal Transoms, Sidelights and Windows.

P. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames.

Q. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames.

R. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames.

S. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.

T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.

U. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

V. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, “CAL-Green”.

W. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

1.06 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. CAL-GREEN Submittals: Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

D. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project. Include 1 copy of NAAMM HMMA-820.

F. Certificates: Provide manufacturer's certification of the following:

1. Products comply with referenced standards.

2. Each and every frame and hollow metal window, sidelite provided are UL listed and labeled for the fire rating indicated at the sizes shown.

G. Manufacturer's Qualification Statement.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: www.steeldoor.org/sdicertified.php/#sle.

B. Maintain at project site copies of reference standards relating to installation of products specified.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:

1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.

2. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.

3. Steelcraft, an Allegion brand: www.allegion.com/us.

4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Provide products and assemblies complying with recommendations of NAAMM Tech Notes HMMA-820 TN03-07 and tested to the following performance:

1. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 1.57 psf pressure differential across assembly.

2. Water Penetration Resistance: No uncontrolled water as described in paragraph "Weather Resistance" above, when tested in accordance with ASTM E331 at pressure differential of 1.57 lbf/sq ft.

C. Requirements for Hollow Metal Doors and Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.

2. Accessibility: Comply with ICC A117.1 and ADA Standards.

3. Door Top Closures: Flush end closure channel, with top and door faces aligned.

4. Door Edge Profile: Hinged edge square, and lock edge beveled.

5. Typical Door Face Sheets: Flush. Refer to Door Schedule for additional information.

6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.

a. A60/ZF180 (galvannealed).

D. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Exterior Doors: Thermally insulated.

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

a. Level 3 - Extra Heavy-duty.

b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.

c. Model Types as indicated on Drawings.

d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.

e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.

2. Door Core Material: Vertical steel stiffeners with fiberglass batts.

3. Door Thermal Resistance: R-Value of 4.

4. Door Thickness: 1-3/4 inch, nominal.

C. Interior Doors, Non-Fire Rated:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

a. Level 3 - Extra Heavy-duty.

b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.

c. Model Types as indicated on Drawings.

d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.

e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M at wet areas (toilet rooms, custodial, food service, locker and shower rooms).

2. Door Core Material: Polystyrene (enhanced thermal performance) and polyurethane (extreme thermal performance)

3. Door Thickness: 1-3/4 inch, nominal.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Thermal Insulation

1. Frame Thermal Resistance: R-Value of[4].

2. Material: Fiberglass or Mineral Wool Batts

D. Exterior Door Frames: Full profile/continuously welded type.

1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.

2. Frame Metal Thickness: 12 gage, 0.093 inch, minimum.

3. Weatherstripping: Separate, see Section 08 7100.

E. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.

1. Acoustic rated doors shall be provided with full height stops.

2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.

F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

G. Mullions for Pairs of Doors: Fixed, with profile similar to jambs.

H. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

I. Transom Bars: Fixed, of profile same as jamb and head.

J. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

K. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.

L. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

M. Frame Anchors: Furnished type of anchorage accepted by the Steel Door Institute. For wall conditions that do not permit installation of floor anchors furnish 1 additional wall anchor.

1. Floor anchors: Furnish 1 per jamb. Minimum 16 gauge galvanized steel. Type with 2 bolts to structure.

2. Jamb anchors:

a. Stud Partitions: Furnish 4 per jamb. Minimum 18 gauge and welded inside each jamb.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 FRAME FABRICATION

A. Cut-out, reinforce, punch and tap for mortise hardware. Where frames are grouted fabricate mortises in frames with mortar-tight back cover. Punch frames and provide silencers except where scheduled to have door seals.

B. Reinforce for surface hardware. Reinforce in accordance with ANSI A115 and SDI-107 except as specified for material gauge.

1. Hinge: No. 7 gauge; 1-1/4-inch by 10-inch, minimum.

2. Strikes: No. 16 gauge formed combination reinforcement and dust cover.

3. Flush bolts, closers, and other surface mounted hardware: No. 12 gauge.

2.07 ACCESSORIES

A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.

1. Style: Sightproof inverted V blade.

2. Security Louvers at exterior locations; Anemostat PLSL.

3. Fasteners: Exposed, tamper proof fasteners oriented to secure side.

B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Astragals for Double Doors: Specified in Section 08 7100.

D. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.

E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Fill all spaces between frame anchors and structure with approved shim material.

C. Coordinate frame anchor placement with wall construction.

D. Install door hardware as specified in Section 08 7100.

E. Install exterior frames and glazing to comply with glazing installation requirements of NAAMM HMMA-820 and Section 08 8000.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

B. Provide field testing of installed hollow metal frames and windows by independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.

1. Perform tests on three individual frames or windows in designated locations as directed by Architect.

2. Conduct tests on individual frames or windows prior to 5 percent, 50 percent, and 90 percent completion of this work.

3. Field test for water penetration in accordance with ASTM E1105 using Procedure B - cyclic static air pressure difference; test pressure shall not be less than 1.57 psf.

4. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.

C. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.06 ADJUSTING

A. Adjust for smooth and balanced door movement.

B. Clean and restore soiled surfaces. Remove scraps and debris, and leave site and a clean condition.

C. Protect completed work from damage. Replace damaged work.

3.07 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; non-rated and _____.

1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.

B. Section 08 7100 - Door Hardware.

C. Section 09 9123 - Interior Painting: Field finishing of doors.

1.03 REFERENCE STANDARDS

A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.

B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.

E. WDMA I.S. 1A - Interior Architectural Wood Flush Doors.

F. WI (CCP) - Certified Compliance Program (CCP).

G. WI (CSIP) - Certified Seismic Installation Program (CSIP).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

C. Woodwork Quality Assurance Program:

1. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

2. Provide designated labels on shop drawings as required by quality assurance program.

3. Provide designated labels on installed products as required by quality assurance program.

4. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:

1. Haley Brothers; ____: www.haleybros.com/#sle.

2. Oregon Door; _____: www.oregondoor.com/#sle.

3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND PANELS

A. Doors: See drawings for locations and additional requirements.

1. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.

1. Provide solid core doors at each location.

2. Wood veneer facing for field opaque finish as indicated on drawings.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS

A. Veneer Facing for Opaque Finish: Medium density overlay (MDO), in compliance with indicated quality standard.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

1. Exception: Doors to be field finished.

E. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified:

2.07 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 1113.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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. Thresholds, gasketing and weather-stripping.

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.

1.03 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE.)

A. 2022 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.

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

1.04 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 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 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:

Heading Number 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) 1	(h)	(i) ea	(j) Hinges - (k) 5BB1HW 4.5 x 4.5 NRP (l) ½ TMS		(m) 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. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

F. 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 that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

G. 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.

H. 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.

I. 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.

1.05 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 in-service 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 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.

F. Product packaging to be labelled in compliance with CA Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986.

1.06 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.

1.07 WARRANTY

A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:

1. Mechanical Locksets: Ten (10) years.
2. Closers: Thirty (30) years.
3. Mechanical exit devices: Ten (10) years.
4. All other hardware: Three (3) years.

1.08 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.

1.09 PRE-INSTALLATION CONFERENCE

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

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

2.01 MANUFACTURERS

Item	Manufacturer	Acceptable Substitutes
Hinges	Ives	Hager, Stanley, McKinney
Locks, Latches & Cylinders	Schlage	No Substitution – Owner Standard
Exit Devices	Von Duprin	No Substitution – Owner Standard
Closers	LCN	No Substitution – Owner Standard
Protection Plates	Ives	Trimco, BBW, DCI
Stops	Ives	Trimco, BBW, DCI
Thresholds	Zero	Pemko, National Guard
Weatherstrip/Gasketing	Zero	Pemko, National Guard

2.02 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.
   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. Continuous Hinges: As manufactured by Ives, an Allegion Company. UL rated as required.

C. 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

2. 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.
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.

D. Schlage “L” Series as scheduled with “06” Style Lever and “A” Style Rose.

1. Locksets to comply with ANSI A156.13, Series 1000, Operational Grade 1 and Security Grade 1 with all standard trims. Locksets shall also comply with UL10C Positive Pressure requirements

2. Lock case shall be manufactured with heavy 12 gauge steel with fully wrapped design. Lock cases with exposed edges are not acceptable. Lock case shall be multi-functional allowing transformation to a different function without opening lock case.
3. Latchbolt shall have ¾" throw and be non-handed, field reversible without opening the lock case. Solid latchbolts and / or plastic anti-friction devices are not acceptable.
4. The deadbolt, when used, shall be 1" throw stainless steel with a ¾" internal engagement when fully extended.
5. All trim shall be through-bolted with the spring cages supporting the trim attached to the lock cases to prevent torqueing.
6. Levers to have independent rotation in both directions. Exterior lever assembly to be one-piece design attached by threaded bushing. Interior lever assembly shall be attached by screwless shank
7. Thru-bolt lever assemblies through the door for positive interlock. Locks using a through the door spindle for attachment are not acceptable. Spindles shall be independent, designed to "break-away" at a maximum of 75psi torque.
8. Hand of lock chassis to be changeable by simply moving one screw from one side to the case to the other and pulling and reversing the latchbolt.
9. Cylinders to be secured by a cast stainless steel, dual retainer. Locks utilizing screws and / or stamped retainers are not acceptable.

E. 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.

F. 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 ¾" 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.
    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.

G. Closers: LCN as scheduled. Place closers inside building, stairs, room, etc.

1. 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.

2. 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.
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.

H. Door Stops:

1. Unless otherwise noted in Hardware Sets, provide wall 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.

I. 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.

J. 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 ¼" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
4. Thresholds shall comply with CBC Section 11B-404.2.5.

K. Seals: Provide silicone gasket at all rated and exterior doors.

1. Fire-rated Doors, Resilient Seals: UL10C Classified complies with NFPA 80 & NFPA 252. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements.
2. 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.

L. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.

M. 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.

2.03 KEYING

A. Furnish a Proprietary Schlage masterkey system as directed by the owner or architect. Key system to be designated and combinated by the Schlage Master Key Department even if pinned by the Authorized Key Center, Authorized Security Center or a local authorized commercial dealer.

B. A detailed keying schedule is to be prepared by the owner and/or architect in consultation with a representative of Allegion or an Authorized Key Center or Authorized Security Center. Each keyed cylinder on every keyed lock is to be listed separately showing the door #, key group (in BHMA terminology), cylinder type, finish and location on the door.

C. Establish a new masterkey system for this project as directed by the keying schedule.

D. Furnish Patent Protected Schlage keys and cylinders on all locks.

E. Furnish construction keying for doors requiring locking during construction.

F. Furnish all keys with visual key control.

1. Stamp key “Do Not Duplicate”.
2. Stamp (BHMA) key symbol on key.

G. Furnish all cylinders with visual key control.

1. Stamp (BHMA) key symbol on side of cylinder (CKC).

H. 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.
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.

I. 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 KS43D3200 padlock for use with FSIC Schlage cylinders. Furnish 20-740 with above.

J. 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 CL77R for use with FSIC Schlage cylinders.

2.04 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.

2.05 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.

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

3.01 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) 2018 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.

3.02 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.

G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.

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

3.04 HARDWARE LOCATIONS

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

3.05 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.

3.06 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.)

IVE =		Ives	Hinges, Protection Plates & Door Stops
LCN	=	LCN	Door Closers
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
VON	=	Von Duprin	Exit Devices
Zero	=	Zero	Thresholds, Gaketing & Weather-stripping

HARDWARE GROUP NO. 01

3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	VANDL CLASSROOM SEC	ND98RD RHO 47342586	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH TB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 02

3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND81RD RHO	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA TB (MOUNT PUSH SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV (OR FS436/FS438 AS DESIRED)	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 03

3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PRIVACY W/INDICATOR	L9056R 06A L583-363 OS-OCC	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA TB (MOUNT PULL SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV (OR FS436/FS438 AS DESIRED)	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 04

3	EA	CONT. HINGE	224XY	628	IVE
1	EA	PANIC HARDWARE	CDSI-PA-AX-99-L-KC-06	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	26-091 ICX XQ11-948	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA TB (MOUNT PUSH SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	RAIN DRIP	142AA (OMIT WHERE OVERHANG OCCURS)	AA	ZER
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	HEAD & JAMB SEAL	328AA-S	AA	ZER
1	SET	GASKETING	429AA-S	AA	ZER
1	EA	THRESHOLD	PER DETAIL		

END OF SECTION

Catalog Cuts

For

Tennyson High School Building G Modernization

Sorted By Manufacturer

Prepared By

Josh DiFabio

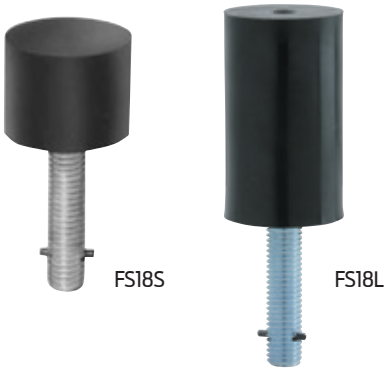
Created On 10/25/2024

Generated By



Table of Contents

Mfr	Catalog Number	Description
IVE	FS18S	FLOOR STOP
IVE	WS401/402CCV	WALL STOP
IVE	8400 10" X 2" LDW B-CS	KICK PLATE
IVE	8400 4" X 2" LDW B-CS	MOP PLATE
IVE	5BB1HW 4.5 X 4.5	HINGE
IVE	224XY	CONT. HINGE
LCN	4040XP RW/PA TB	SURFACE CLOSER
LCN	4040XP SCUSH TB	SURFACE CLOSER
SCH	20-057 ICX	RIM CYLINDER
SCH	L9056R 06A L583-363 OS-OCC	PRIVACY W/INDICATOR
SCH	ND81RD RHO	STOREROOM LOCK
SCH	ND98RD RHO 47342586	VANDL CLASSROOM SEC
SCH	26-091 ICX XQ11-948	MORTISE CYLINDER
SCH	23-030 EV29 T	FSIC CORE
VON	CDSI-PA-AX-99-L-KC-06	PANIC HARDWARE
ZER	142AA (OMIT WHERE OVERHANG OCCURS)	RAIN DRIP
ZER	328AA	DOOR SWEEP
ZER	328AA-S	HEAD & JAMB SEAL
ZER	429AA-S	GASKETING
ZER	488SBK PSA	GASKETING



FS18S FS18L Floor Stops

- Security Door Stops designed for use in high vandalism areas.
- Molded from black flame resistant, resilient material around a heavy-duty stud.
- Once grouted in concrete, leaves no exposed fasteners to be tampered with or removed.
- Ideal for jail or security cell areas where floor mounted stops are required.
- FS18L also ideal for concrete wall applications.

Dimensions

FS18S Height: 1-1/2"
FS18S Diameter: 2"
FS18S Stud Length: 2-1/2"

FS18L Height: 3-1/2"
FS18L Diameter: 2"
FS18L Stud Length: 2-1/2"



FS434 Floor Stop

- Burnished wrought steel.
- For undercut doors up to 1-1/2".
- Packed with screws and plastic anchors.
- Replaceable soft, resilient gray rubber.

Dimensions

Overall Height: 2-5/8"
Base Size: 1-1/2" W x 2-3/4" L

Finishes

Ives Number	USC
BHMA	604



430 Floor Door Stop

- Burnished wrought steel.
- For undercut doors up to 1-1/2".
- Packed with screws and plastic anchors.
- Replaceable soft, resilient gray rubber.

Dimensions

Overall Height: 1-5/16"
Base Diameter: 1-1/4"

Finishes *brass*

Ives Number	B3	B4	B5	B10B	B15	B26	B26D
BHMA	605	606	609	613	619	625	626

Finishes *aluminum*

Ives Number	A3*	A5	A14	A92
BHMA	666		669	673

** only available in Slim-Pak of 25*



WS401CCV & WS402CCV
Meets ANSI/BHMA 156.16 L12251 for brass

WS401CVX & WS402CVX
Meets ANSI/BHMA 156.16 L12101 for brass

WS401CVX Wall Bumpers
WS401CCV
WS402CVX
WS402CCV

- Constructed in heavy-duty cast brass.
- Special retainer cup makes rubber tamper resistant.

WS401CVX (401) – convex rubber bumper, packed with wood screw and plastic anchor.
WS401CCV (401-1/2) – concave rubber bumper which avoids damage to locks with projecting buttons, packed with wood screw and plastic anchor.
WS402CVX (402) – convex rubber bumper packed with screw and drywall anchor.
WS402CCV (402-1/2) – concave rubber bumper which avoids damage to locks with projecting buttons and is packed with screw and drywall anchor.

Dimensions

Base Diameter: 2-1/2"
Base Thickness: 3/8"
Overall Projection: 1"

Finishes

Ives Number	US3	US4	US10	US10B	US15	US26	US26D
BHMA	605	606	612	613	619	625	626



WS404CVX Wall Bumpers

- Compact size.
- Constructed in cast brass.
- Totally concealed mounting discourages vandalism or tampering.
- Unit furnished with grey convex rubber bumper.
- Packed with sheet metal screw, rawl plug and brad.

Dimensions

Base Diameter: 1"
Overall Projection: 17/32"

Finishes

Ives Number	US3	US4	US5	US10	US10B	US15	US26	US26D
BHMA	605	606	609	612	613	619	625	626

8400 Series Protection Plates

- Door protection plates are available in .050" thick brass, stainless steel or aluminum; and 1/8" thick high impact polyethylene in clear or black.
- Bevel edge options; specify B4E for all four edges.
- Mounting screw pack furnished standard, 16 screws per pack. Optional screw packs are available for TEK or TORK screw heads. Refer to the following chart for ordering.
- Specify NMH for no mounting holes. (Not available on 8402)
- Specify NMH-A for no mounting holes with adhesive. (Not available on 8402)
- Specify CS for counter sunk mounting holes.
- Specify ERS prepped with extra row of screws.

Kickplate Gasket Tape Tape is recommended when using a brass plate on a metal door to reduce tarnishing from electrolytic oxidation. One tape pack will cover an the perimeters of a 8" x 34" kickplate. Order 8401 Gasket Tape.



8400 Protection Plate
8402 (UL)* Protection Plate

**UL mark appears in upper right corner. Factory supplied screws must be used.*

Number of screw packs required by plate size (specify TEK Screws or TORK screws).

	22"-25"	26"-33"	34"-41"	42"-48"
4"-8"	1	1	1	1
9"-16"	1	1	1	1
17"-24"	1	1	1	2
25"-32"	1	1	2	2
33"-40"	1	2	2	2
41"-48"	2	2	2	2

Finishes *brass 24" x 48" max. size*

US Number	US3	US4	US10	US10B	US15	US26	US26D
BHMA	605	606	612	613	619	625	626

Finishes *stainless steel*

US Number	US32	US32D
BHMA	629	630

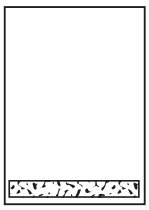
Finishes *aluminum*

US Number	US28
BHMA	628

Finishes *plastic*

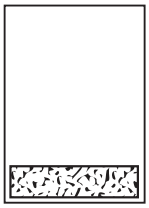
Clear and Black

Residential Grade Kickplates available Carded only, finishes PA28, PA3, PA619, PA716, B3, B505, B619, B716



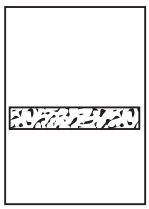
Mop Plates

- Protect the bottom of the pull side of door subject to cleaning and mopping procedures.
- Size Ranges:4" to 6" high, 22" to 48" wide



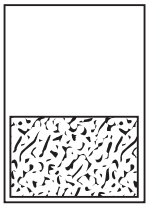
Kick Plates

- Protect the bottom of the push side of doors subject to scuffing from foot traffic.
- Recommended for all doors subject to normal use (especially doors using a closer).
- Size Ranges: 8" to 24" high, 22" to 48" wide



Stretcher Plates

- Protect doors at specific areas where consistent contact is made by stretchers, service carts or other equipment.
- Usually applied to push side of doors.
- Specify "B4E" Option for beveled edges.
- Size Ranges: 6" to 8" high, 22" to 48" wide



Armor Plates

- Protect lower half of doors from abuse by hard carts, trucks and rough usage.
- Usually applied to push side of single doors and both sides of double acting doors.
- Size Ranges: 26" to 48" high, 22" to 48" wide



Meets ANSI/BHMA A156.1
A8111 – Steel
A5111 – Stainless Steel
A2111 – Brass

5BB1HW 5 Knuckle, Ball Bearing, Heavy Weight Full Mortise Hinge

- For heavy weight doors
- High frequency usage
- 4 ball bearing
- Packed with wood and metal screws

Options
- NRP, Non-Removable Pin
- SH, Security Stud
- HT, Hospital Tip
- RC, Round Corners - 1/4" or 5/8" Radius
- SEC, Security Fastners - Pin-in-Socket

Dimensions

Size (Inches)	Size (mm)	Gauge	Size (Inches)	Size (mm)	Gauge
4.5 x 4	114 x 102	0.180	5 x 4.5	127 x 114	0.190
4.5 x 4.5	114 x 114	0.180	5 x 5	127 x 127	0.190



Meets ANSI/BHMA A156.1
A8111 – Steel

5BB1WT 5 Knuckle, Ball Bearing, Wide Throw Full Mortise Hinge

- For medium weight doors
- Medium frequency usage
- 2 ball bearing
- Packed with wood and metal screws

Options
- NRP, Non-Removable Pin
- SH, Security Stud
- HT, Hospital Tip
- RC, Round Corners - 1/4" or 5/8" Radius
- SEC, Security Fastners - Pin-in-Socket

Dimensions

Size (Inches)	Size (mm)	Gauge
4.5 x 5	114 x 127	0.134
4.5 x 6	114 x 152	0.134
5 x 6	127 x 152	0.146
5 x 7	127 x 178	0.146
5 x 8	127 x 203	0.146

Finishes *brass*

Ives Finish	US3	US4	US10	US10B	US10A	US11	US15	US26	US26D
BHMA	605	606	612	613	614	616	619	625	626

Finishes *steel*

Ives Finish	USP	US3	US4	US10	US10B	US10A	US11	US15	US26	US26D
BHMA	600	632	633	639	640	641	643	646	651	652

Finishes *stainless steel*

Ives Finish	US32	US32D
BHMA	629	630



224XY Full Mortise - Door Edge Protector

UL10C certified
Meets ANSI 156.26 for 150 lbs and 300 lbs.

- For 1 3/4" Doors
- Door Edge Protector
- Patented center loaded, interlocking bearing design
- Non Handed for custom cut lengths
- 1/16" door inset
- 48" Maximum Door Width
- Beveled or Square Edge Doors
- Frame guidance lip is extended further for retrofit applications to cover existing heavy weight architectural hinge preps
- For doors weighing up to 450 pounds without reinforcing, 600 pounds with reinforcing
- For lead-lined application consult factory for engineering specials

Standard lengths 83", 85", 95", 119"

Standard Mounting Hardware

12-24 x 3/4" Steel Self Drilling / Self Tapping Phillips Head Screw

Finishes

Clear Anodized (US28), Dark Bronze Anodized (313AN)
Custom Anodizing and Painting are available, consult factory

Options:

HT	Hospital Tip
EPT	Electric Power Transfer
TWP CON	Electrical Through Wire Panel with Allegion Connect

Optional Mounting Hardware:

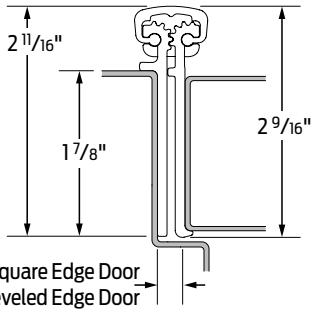
TEK/WD	1/2 Self Drill, Self Tap 1/2 Wood
WD	Wood Door and Frame

Available Accessory Kits:

Security Screws - Hollow Metal
Security Screws - Wood
Thread Forming Screws

For Single Door Applications

For pairs of doors see chart and general information



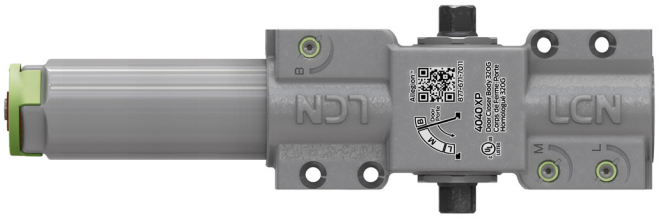
5/16" Clearance for Square Edge Door
11/32" Clearance for Beveled Edge Door

LCN®



Surface mounted closer

4040XP Series



Overview

The 4040XP Series is LCN's most popular door closer—and for good reason. This durable non-handed, surface-mounted heavy-duty closer, is designed for the most demanding high-use-and-abuse applications.

- ANSI/BHMA A156.4 Grade 1 rated
- Meets ADA reduced opening force requirements
- cUL listed and UL listed for self-closing doors without hold-open

The beauty of the 4040XP is that it goes way beyond the required standards. And in doing so, it has set the standard for reliability, longevity, and value.

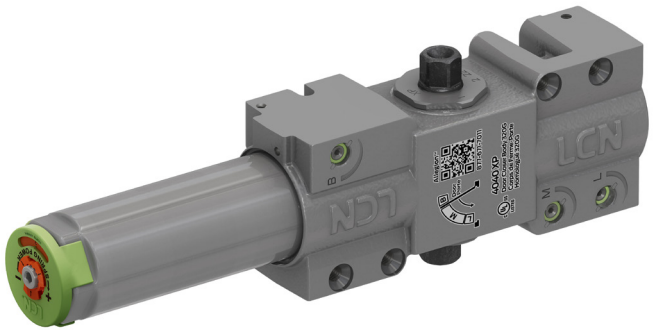
- Stronger materials designed to go the distance.
- Proven production processes and technology, such as, forging steel and heat-treating certain components, that ensure a tougher, bolder construction.
- Abuse-cycle and temperature tests that mimics what door closers encounter in high-abuse environments.
- Well-marked adjustment valves and built-in preventative measures for adjusting too far and breaking the closer.
- 30-year limited warranty

Our relationship with you doesn't end at the sale. LCN supports you throughout the life of your facility with all your technical and application needs. Bottom line, the 4040XP is a closer you can count on that's built to last a lifetime—all while delivering remarkable value in a variety of applications.

Cylinder

4040XP-3071
Cast iron cylinder assembly

Handing	Sizing
Non-handed	Adjustable spring size 1–6, includes LCN Green Dial



Available cylinder options

DEL	Delayed action cylinder

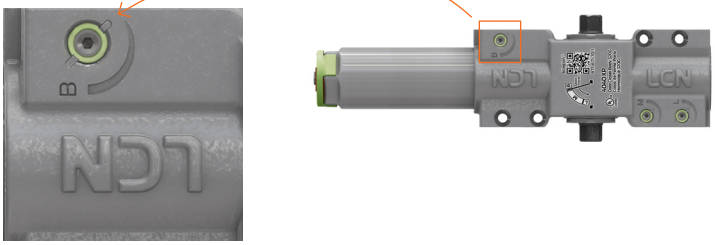
ALLEGION™

Adjustments

There are several design features that make installation or adjustment of the 4040XP easier and more intuitive.

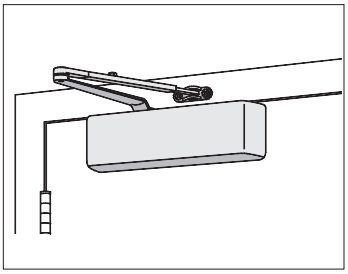
- **LCN Green Dial** provides a visual reference of the spring power setting, taking the guesswork out of spring power adjustments.
- **Additional adjustments** can be made to the back check, main, and latch regulation valves which are labeled for easy identification.
  - **Note:** Labels correspond to a diagram with door swing zones located on the closer body.
- **A patent-pending positive stop feature** on all regulation valves. The improved staking feature prevents the screw from being backed out and causing accidental damage to the product.
  - The patent-pending regulation valve indicators provide visual color indicators of how far a screw is backed out—the more visible the component, the faster the speed.
  - This makes adjustments simpler and more intuitive.
- **New QR code** that provides on-the-spot access to interactive installation and maintenance instructions and tech support.



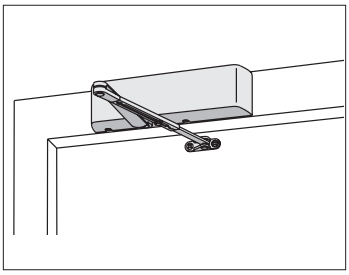




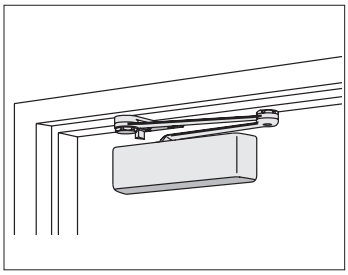
Mounting



Hinge (pull side)



Top jamb (push side)



Parallel arm (push side)

Finishes

Powder coat finishes

622
Matte Black

689
Aluminum

690
Statuary Bronze

691
Light Bronze

693
Black

695
Dark Bronze

696
Brass

150+ additional custom colors available using the RAL numbering system

Metal plated finishes

632
Bright Brass

633
Satin Brass

639
Satin Bronze

616
Satin Bronze, Blackened

646
Satin Nickel

651
Bright Chrome

652
Satin Chrome

Available finish options

MTLPC	Brite metallic: Custom powder coat finish, which resembles that of 651 or 652 plated finish.
SRI	For installations where a higher level of protection against weather conditions, or the effects of a potentially corrosive atmosphere is required, LCN offers a special rust inhibiting (SRI) process. Ferrous metal components receive an SRI pretreatment and a standard powder coat finish of your choice, or a custom powder coat finish for a nominal additional cost. Closers treated with the SRI process exceed the 100 hour protection level available with standard LCN powder coated finishes.

Covers

Standard cover



Front view



Back view

4040XP-72
plastic cover (PC)
- Non-handed
- Includes 4040XP-54 snap-on cover clip
- Redesigned snap-fit cover with improved patent-pending retention fit

Optional cover



4040XP-72MC
metal cover (MC)
- Handed
- Required for plated finishes and custom powder coat finishes
- Optional

Arms



4040XP-3077
Regular Arm (REGARM)
- Non-handed
- Mounts pull side or top jamb with shallow reveal P4041 closer includes PA shoe, 4040XP-62PA required for parallel arm mounting



4040XP-3077L
Long Arm (LONG)
- Non-handed
- Includes long rod and shoe, 4040XP-79LR for top jamb mount
- Optional



4040XP-3077ELR
Extra Long Arm (XLONG)
- Non-handed
- Includes extra long rod and shoe, 4040XP-79ELR for top jamb mount with deep reveal
- Optional



4040XP-3049
Hold Open Arm (H)
- Non-handed
- Mounts pull side or top jamb with shallow reveal, hold open adjustable shoe
- 4040XP closer includes 4040XP-62PA shoe required for parallel arm mounting
- Optional



4040XP-3049L
Hold Open Long Arm (HLONG)
- Non-handed
- Includes long head and tube, 4040XP-3048L for top jamb mount
- Optional



4040XP-3077EDA
Extra Duty Arm (EDA)
- Non-handed
- Features forged, solid steel main and forearm for potentially abusive installations
- Optional



4040XP-3049EDA
Hold Open Extra Duty Arm (HEDA)
- Handed
- Parallel arm features forged, solid steel main and forearm for potentially abusive installations
- Hold open function is adjusted at the shoe
- Optional



4040XP-3077EDA/62G
Extra Duty Arm with 62G Thick Hub Shoe (EDAW62G)
- Non-handed
- Features forged, solid steel main and forearm for potentially abusive installations
- 62G shoe provides additional blade stop clearance
- Optional



4040XP-3049EDA/62G
Hold Open Extra Duty arm with 62G Thick Hub Shoe (HEDA62G)
- Handed
- Features forged, solid steel main and forearm for potentially abusive installations
- 62G shoe provides additional blade stop clearance; hold open function is adjusted at the shoe
- Optional



4040XP-3077CNS
Cush-n-Stop Arm (CUSH)
- Non-handed
- Features solid forged steel main arm and forearm with stop in soffit shoe.
- Optional



4040XP-3049CNS
Hold Open Cush-n-Stop Arm (HCUSH)
- Non-handed
- Hold open function with templated stop/hold open points
- Handle controls hold open function
- Optional



4040XP-3077SCNS
Spring Cush-n-Stop Arm (SCUSH)
- Non-handed
- For potentially abusive applications features solid forged steel main arm and forearm with spring loaded stop in the soffit shoe
- Optional

Arms



4040XP-3049SCNS
Spring Hold Open Cush-n-Stop Arm (SHCUSH)

- Non-handed
- For potentially abusive applications features solid forged steel main arm and forearm with spring loaded stop in the soffit shoe
- Handle controls hold open function
- Optional

Installation accessories



4040XP-18
Plate
- Required for hinge side mount where top rail is less than 3 3/4" (95 mm)
- Requires minimum 2" (51 mm) minimum top rail



4040XP-18G
Plate
- Locates top jamb mounted closer flush with top of head frame face in flush ceiling condition
- Requires 1 3/4" (44 mm) minimum head frame



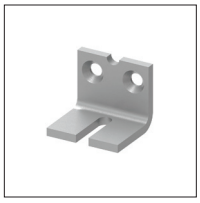
4040XP-18TJ
Plate
- Centers top jamb mounted closer vertically on head frame where face is less than 3 1/2" (89 mm). Plate requires 1 3/4" (44 mm) minimum head frame



4040XP-18PA
Plate
- Required for parallel arm mounting where top rail is less than 5 1/2" (140 mm), measured from the stop
- Requires 2" (51 mm) minimum top rail



4040XP-62PA
PA shoe
- Required for parallel arm mounting



4040XP-30
CUSH shoe support
- Provides anchorage for fifth screw used with CUSH arms, where reveal is less than 3 1/16" (78 mm)
- Optional



4040XP-61
Blade stop spacer
- Required to lower parallel arm shoe to clear 1/2" (13 mm) blade stop
- Optional

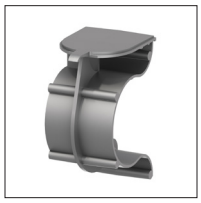


4040XP-419
PA flush panel adapter
- Provides horizontal mounting surface for parallel arm shoe on single rabbeted or flush frame
- Optional

Installation accessories



4040XP-62A
Auxiliary shoe
- Requires a top rail of 7" (178 mm)
- Shoe replaces -62PA for parallel arm mounting of regular arm with overhead holder/stop
- Optional



4040XP-54
Snap-on cover clip
- Used to secure 4040XP-72 plastic cover to cylinder body

Fasteners

Self-reaming and tapping screws included standard

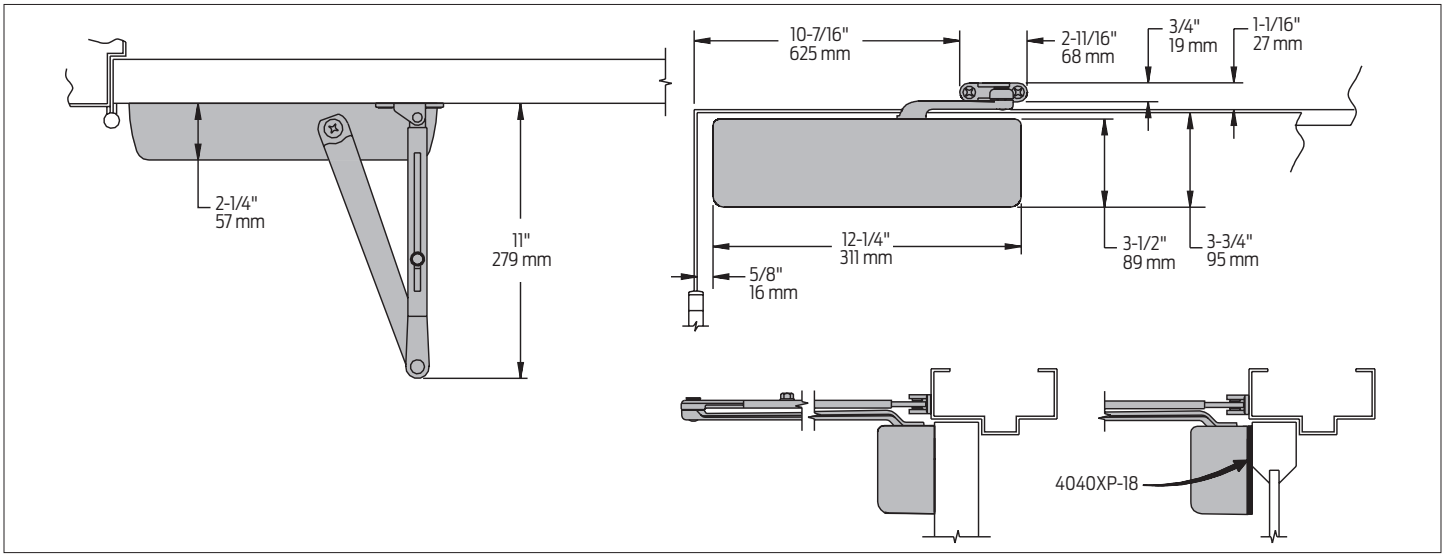
Fastener pack options

TBSRT	TB[1] with self-reaming and tapping screws
WMS	Wood and machine screw
TBWMS	TB[1], wood and machine screw
TORX	TORX machine screw
TBTRX	TB[1] and TORX machine screw

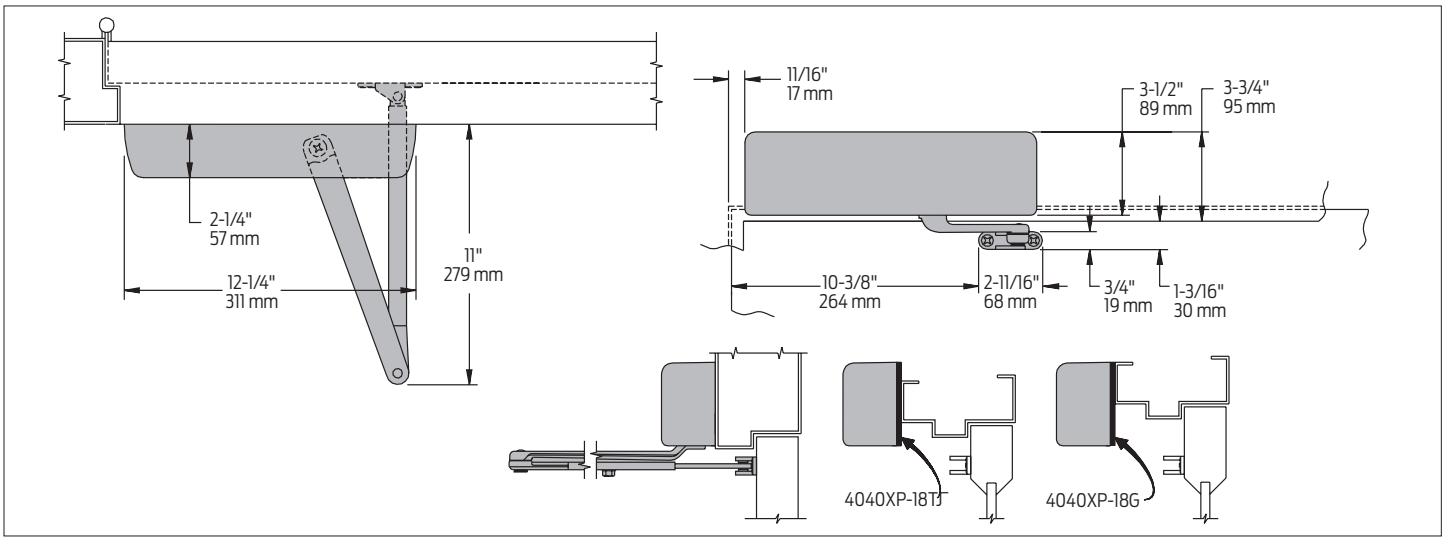
[1] Specify door thickness if other than 1 3/4"

Dimensions and mounting

Hinge (pull) side mounting

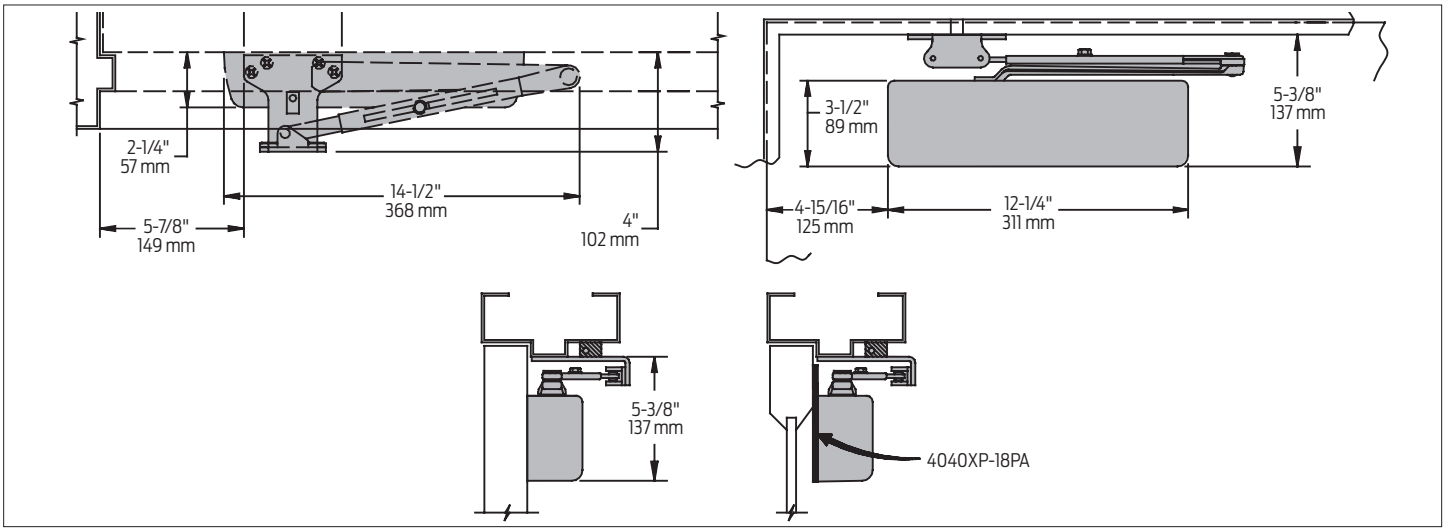


Top jamb (push side) mounting

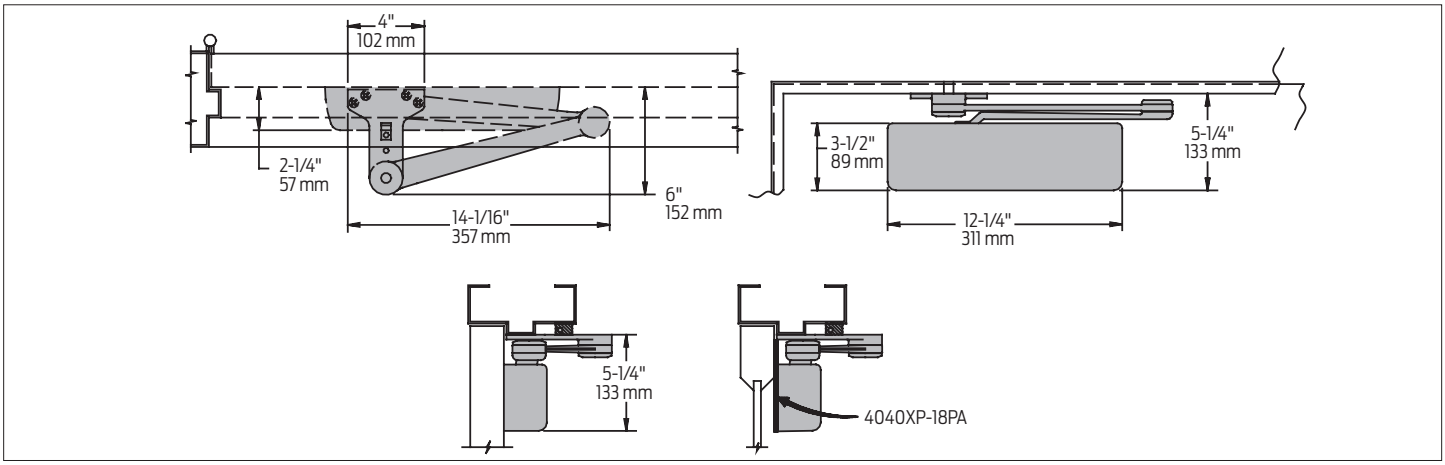


Dimensions and mounting

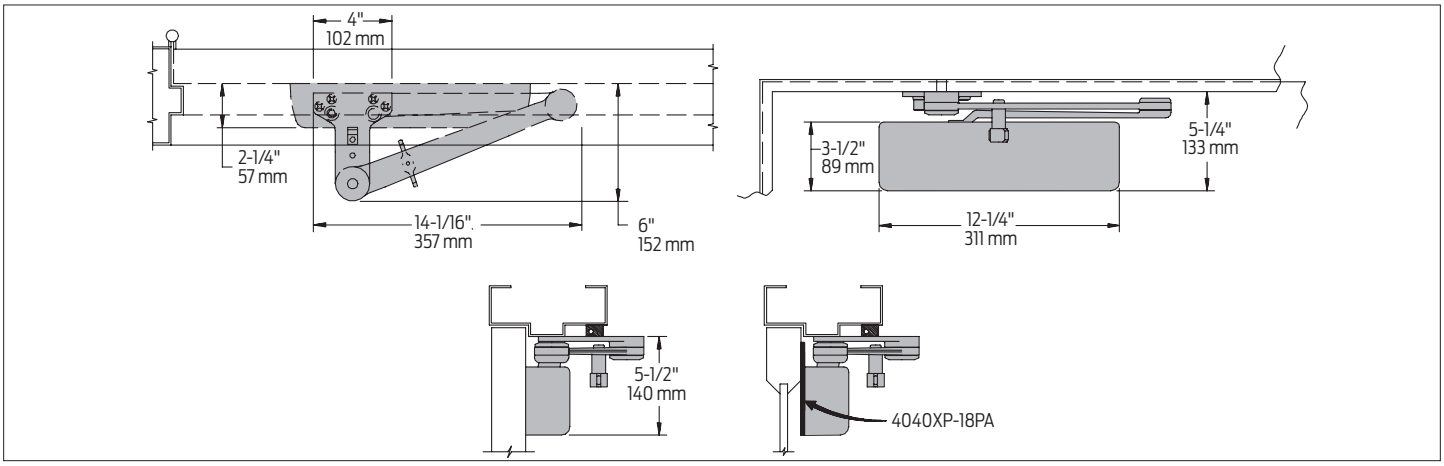
Parallel arm (push side) mounting



EDA mount



CUSH mount



Specifications

Accessibility	Available with less than 5.0 lbs. opening force on 36" door
Certifications/ approvals	▪ Grade 1 – ANSI A156.4 ▪ UL 10C ▪ Meets BAA – Buy American Act
Degree of operation	Hinge (pull) side Max opening: 120° Hold open: 90–120° Top jamb (push side) mount Max opening: 120° Hold open: 85–120° Parallel arm with 62PA Max opening: 180° Hold open: 180° EDA Max opening: 180° Hold open: 180° Cush and spring cush Max opening: 110° Hold open: 110°
Environmental conditions	▪ Approved for interior use ▪ Approved for exterior use (SRI coated only) ▪ LCN's standard all weather fluid performs to temperature ranges from 120°F (49°C) to -30°F (-35°C) ▪ LCN's powder coat finish surpasses 100 hours of salt spray which is over four times the ANSI standard for corrosion resistance.
Warranty	30 years
Standard features	Quality and durability ▪ **Cast iron cylinder** for rugged performance ▪ **Single-piece, heat-treated forged steel arms** to withstand greater forces ▪ **Heat-treated 1 1/2" diameter piston** for extra hardness and strength ▪ **Double heat-treated steel pinion 11/16" journal diameter** for greater wear-resistance

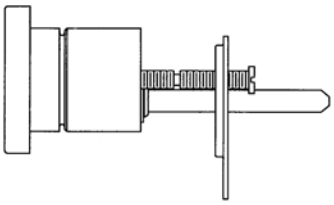
Standard features	▪ **Full complement bearings with minimum 0.5" height** to help withstand abuse ▪ **All-weather Liquid X fluid** for consistent performance through every season ▪ **Non-PRV (pressure relief valve) design** to minimize risk of property damage, injury, increased maintenance, and liability exposure ▪ **Snap-on cover with patent-pending retention improvement** to protect the products ▪ **Powder coat finish** that lasts longer than spray lacquer ▪ **30-year warranty** Ease of installation and adjustment ▪ **Tight tolerances in manufacturing** for accuracy and precision ▪ **LCN Green Dial** to take the guesswork out of spring force adjustments ▪ **Peel-n-stick template** for quick and accurate installation ▪ **Patent-pending positive stop** to prevent the screw from being backed out ▪ **Patent-pending regulation valve indicators** for visual color indicators ▪ **Independent speed adjustments** for greater door control ▪ **Graphic visuals and indicators** to make adjustments faster, easier, and consistent ▪ **QR code** for on-the-spot access to interactive instructions and tech support Flexibility ▪ **Universal** non-handed design ▪ **Full ranges** of mounts ▪ **Adjustable** spring sizes 1–6

© 2022 Allegion
013110, Rev. 05/2022
www.allegion.com/us

ALLEGION™

Full size interchangeable core cylinders for exit devices, aluminum door, etc.





Interchangeable core rim cylinders for exit devices	
Number	Core mechanism
20-057	Conventional core
20-757	Primus core
20-757-XP	Primus XP core
20-079	Housing only, less core

Available in 605, 606, 609, 612, 613, 619, 625, 626, and 643e finish.



Cylinders for Adams Rite MS and 4700 Series Lori 4500 Series and Corbin Russwin DL3000 Series		
Number	Core mechanism	Collar
26-098	Conventional core	Compression ring & spring
20-062	Conventional core	3/16" + 3/8" blocking rings
20-766	Primus core	3/16" + 3/8" blocking rings
20-766-XP	Primus XP core	3/16" + 3/8" blocking rings
20-060	Housing less core	None

These cylinders include set screw pack B220-050 for Adams Rite locks.



K510-711
Adams Rite
MS cam

Cylinders for Adams Rite 4070 Series deadlocks		
Number	Core mechanism	Collar
20-091	Conventional core	3/16" + 3/8" blocking rings
20-722	Primus core	3/16" + 3/8" blocking rings
20-722-XP	Primus XP core	3/16" + 3/8" blocking rings
20-090	Housing less core	None



B520-378
Adams Rite
4070 cam

Notes
1. Mortise cylinders available 605, 606, 609, 612, 613, 619, 625, 626, and 643e finish. Cores furnished 606 and 626 only.
2. To differentiate between Classic and Everest 29, specify keyway. Example: C or CP (Classic), S123 (Everest 29).
3. All cylinders are 1 1/2" long.
4. Specify LKB if 0-bitted Primus XP cylinders are required less key blanks.

L Series

Grade 1, Mortise Locks



OVERVIEW

The Schlage® L Series has long been the benchmark for Grade 1 mortise locks. Beyond strength and security–it offers flexibility to meet most needs. Sixty-one mechanical functions include ten non-levered small- and large-case deadbolt functions and nine electrified functions that are regularly used as part of electronic access control systems. L Series locks have the ability to suite across electronic, tubular, exit trim, and multi-point locks to integrate seamlessly into any environment. The series features an array of security options including patented, 180-degree high visibility lock status indication trim, key override of a thumbturn being held, and support for multiple keyway families and cylinder types including Primus® XP high-security cylinders.



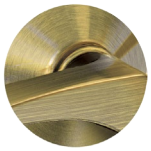
FINISHES



605
Bright Brass



606
Satin Brass



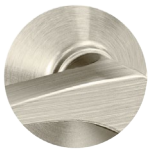
609
Antique Bronze



612[1]
Satin Bronze



613[1]
Oil Rubbed Bronze



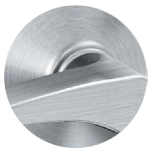
619
Satin Nickel



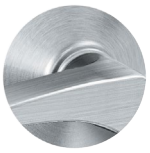
622
Matte Black



625
Bright Chrome



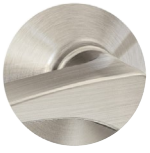
626
Satin Chrome



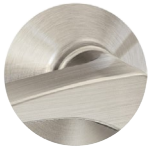
626AM
Satin Chrome Antimicrobial



629[2]
Bright Stainless Steel



630[2]
Satin Stainless Steel



630AM[2]
Satin Stainless Steel Antimicrobial



643e
Aged Bronze



1. Available on standard levers only, not available on Latitude, Longitude, Accent, Asti, or Merano.
2. Not available on Accent, Asti, or Merano.

STANDARD LEVER AND KNOB STYLES



01
801 - Milled tactile warning



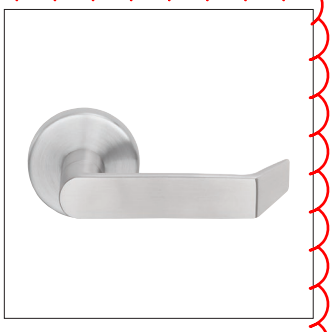
02
802 - Knurled tactile warning[1]



03 (Tubular)
803 - Knurled tactile warning[1]



05
805 - Milled tactile warning



06 (Rhodes)
806 - Milled tactile warning



07 (Athens)
807 - Milled tactile warning



12
812 - Milled tactile warning
Handed



17 (Sparta)
817 - Milled tactile warning

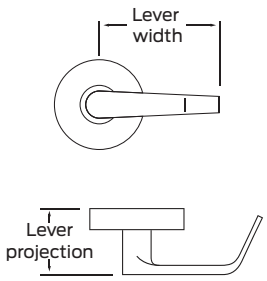


18
818 - Milled tactile warning

Dimensions

Lever	Width	Projection
01	3.88"	2.69"
02	4.75"	2.81"
03 (Tubular)	4.75"	2.81"
05	3.75"	2.88"
06 (Rhodes)	4.63"	2.5"
07 (Athens)	4.63"	2.88"
12	4.63"	3.06"
17 (Sparta)	4.75"	3"
18	4.88"	2.69"

Return to door meets 1/2" requirement for 03, 06 and 17 levers.



1. Knurled tactile warning available on 609, 612, 613, 625, 626, 629, and 630 finishes only.

Note: Images shown with Schlage L mortise 'A' rose; additional rose and escutcheon designs available.

ESCUTCHEONS



L full face
Specify by adding 'L' after lever design.

Finishes: available in all L Series finishes.



L concealed
Specify by adding 'C' suffix to function and by adding 'L' after lever design.

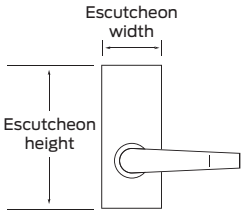
Finishes: available in all L Series finishes.



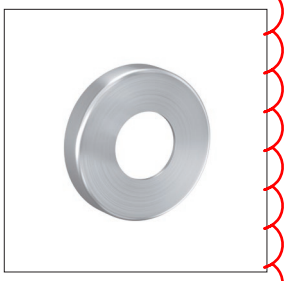
N full face
Specify by adding 'N' after lever design.

Finishes: available in all L Series finishes.

Escutcheon	Width	Height
L full face	1.75"	7.938"
L concealed	1.75"	7.938"
N full face	2.5"	7.875"



ROSES



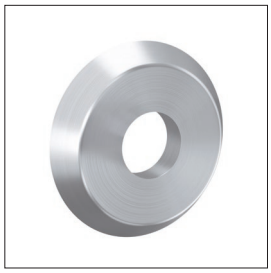
A rose
Available for use on L Series knob and lever designs. Specify by adding 'A' after lever design.

Finishes: available in all L Series finishes.



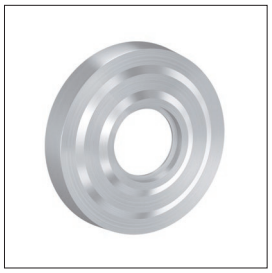
B rose
Available for use on L Series knob and lever designs. Specify by adding 'B' after lever design.

Finishes: available in all L Series finishes.



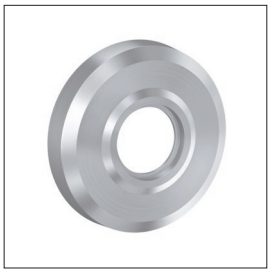
C rose
Available for use on L Series knob and lever designs. Specify by adding 'C' after lever design.

Finishes: 605, 606, 609, 619, 622, 625, 626, 629, 630, 643e.



AVA rose
Available for use with AST lever only. Specify as ASTAVA.

Finishes: 605, 606, 609, 619, 622, 625, 626, 643e.



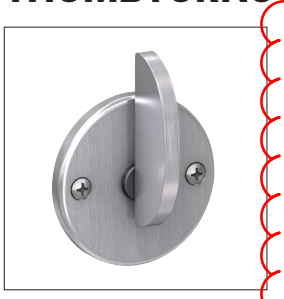
MER rose
Available for use with MER lever only. Specify as MERMER.

Finishes: 605, 606, 609, 619, 622, 625, 626, 643e.

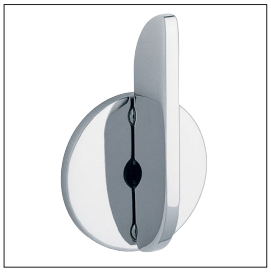
Rose	Diameter
A	2.125"
B	2.562"
C	2.625"
AVA	2.625"
MER	2.625"



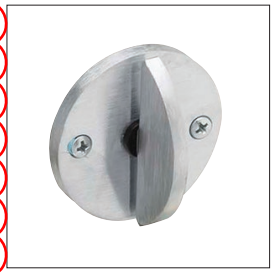
THUMBTURNS



ADA thumbturn (standard)
09-544



Large ADA thumbturn
09-509 x L583-363
Not available with L9463 and L463



Basic thumbturn

INDICATORS

Inside Trims



Thumbturn



Key cylinder



Chevron

Standard for lock functions L9486, L9496 and L496, used with A or B roses only. Available messages: "OCCUPIED", "DO NOT DISTURB" or "LOCKED".

Outside Trims



Emergency key



Coin turn



Key cylinder

Available messages

	LOCKED	OCCUPIED	DO NOT DISTURB	
	UNLOCKED	VACANT		
Inside trim	IS-LOC	IS-OCC	IS-DND	IS-SYM
Outside trim	OS-LOC	OS-OCC	OS-DND	OS-SYM
Inside trim	IS-LOCFR	IS-OCCFR	–	–
Outside trim	OS-LOCFR	OS-OCCFR	–	–

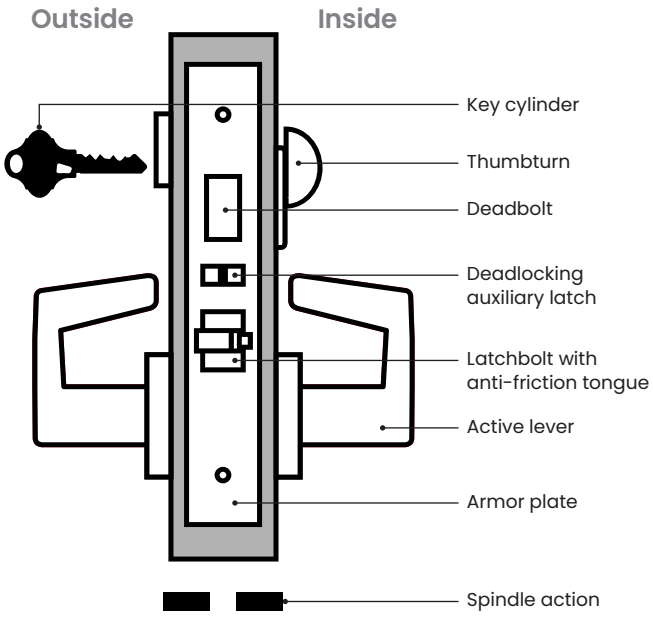
Note: Spanish language options available via RFQ.

Dimensions

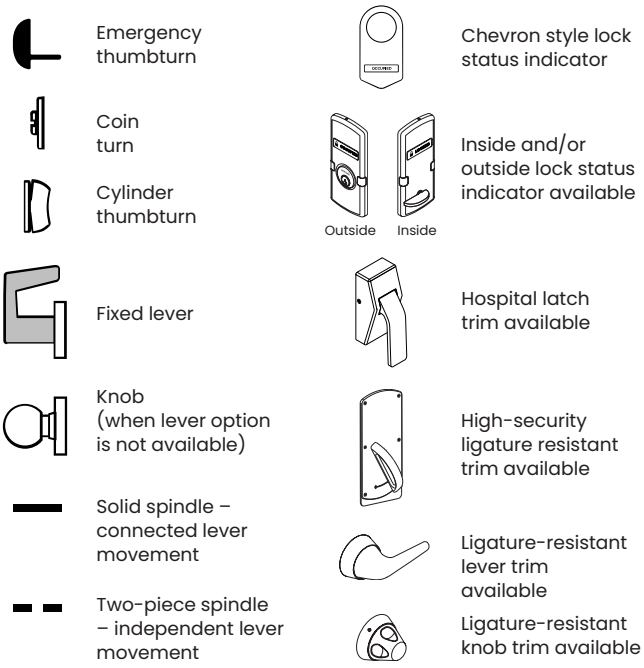
	Width	Height
Escutcheon	2.6"	9.7"
Sectional	2.6"	6.1"
Main window	2"	0.6"
Side windows	0.3"	0.6"

MECHANICAL LOCK FUNCTIONS

Legend



Key



Product identification guide

LV9460 with XL11-635

Lock series and function code
L = standard
LV = Vandlgard® option
LM = multi-latch
LMV = multi-latch with Vandlgard

0 = no lock case (dummy trim)
9 = functions with lock case

0 = no deadbolt
1 = dummy trim
4 = with deadbolt

Function code

Functions requiring special ordering nomenclature

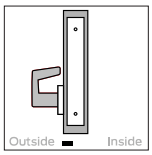


Vandlgard® feature helps protect the lock chassis from damage.

The Vandlgard optional feature available on many functions allows the outside lever to rotate freely down when in a locked state. This limits the ability of vandals to apply excessive force to the lever helping to prevent damage to internal components.

NON-KEYED DUMMY FUNCTIONS

Schlage **ANSI**
L9175 **-**



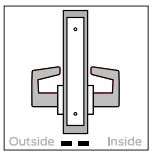
Half dummy trim with lock case

- Lever (or knob) only-one side; blank armor front without latchbolt
- Lever always fixed

Note: Includes blank armor front and lock case.

Door handing must be specified. May be ordered with optional XL11-743 armor front with cutout to receive deadbolt.

Schlage **ANSI**
L9176 **-**



Full dummy trim with lock case

- Levers (or knobs) only-both sides; blank armor front without latchbolt
- Both levers always fixed

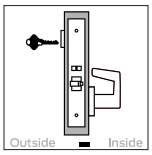
Note: Includes blank armor front and lock case.

May be ordered with optional XL11-743 armor front with cutout to receive deadbolt.

Ordering: In a double-door application where dummy is used as the strike, order 10-091 armored front strike separately.

SINGLE CYLINDER NON-DEADBOLT FUNCTIONS

Schlage **ANSI**
L9026 **-**



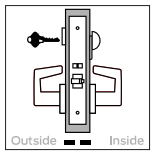
Exit lock with cylinder

- Key cylinder only, no lever (or knob) outside; lever only-inside; latchbolt and deadlocking auxiliary latch
- Latchbolt retracted by lever from inside
- Key outside retracts latchbolt
- Inside lever always free for immediate egress

Note: Available in rose or L escutcheon trim only.

When ordering, specify door handing.

Schlage **ANSI**
L/LV9050 **F04**



Entrance/office lock

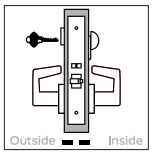


- Key cylinder outside; thumbturn inside; latchbolt and deadlocking auxiliary latch
- Latchbolt retracted by lever (or knob) from either side
- Outside lever is made inoperative by key outside or by turning inside thumbturn; Vandlgard® option allows both levers to rotate freely down while locked
- Key outside unlocks outside lever and retracts latchbolt
- Rotating inside thumbturn unlocks outside lever; turning inside lever retracts latchbolt but does not unlock
- Inside lever always free for immediate egress

Caution: Egress without fully rotating the thumbturn to vertical position can result in lock-out situations.

Note: Hospital latch and ligature-resistant trims not available with Vandlgard option.

Schlage **ANSI**
L/LV9056 **-**
L/LV9056 with XL13-439



Entrance/office lock with automatic unlocking



- Key cylinder outside; thumbturn inside; latchbolt and deadlocking auxiliary latch
- Latchbolt retracted by lever (or knob) from either side
- Outside lever is made inoperative by key outside or by turning inside thumbturn; Vandlgard® option allows outside lever to rotate freely down while locked
- Key outside unlocks outside lever and retracts latchbolt; XL13-439 option also allows key override of thumbturn if being held in locked position
- Rotating inside thumbturn unlocks outside lever; turning inside lever retracts latchbolt and unlocks outside lever; closing door also unlocks preventing lock-out
- Inside lever always free for immediate egress

Note: Ligature-resistant trims not available with Vandlgard option.

To order with key override, specify function and note XL13-439 as a special option.

CYLINDERS

Conventional mortise cylinder options	
P6	6-pin cylinder (default) with Schlage logo
P	6-pin cylinder, keyed 5
Z	Everest SL cylinder, 7-pin (A2 pinning) with Schlage logo
L	Less conventional cylinder
C6	Concealed mortise, 6-pin
C	Concealed mortise, 6-pin cylinder, keyed 5
W	Less concealed mortise cylinder

Full size interchangeable core (FSIC) mortise cylinder options	
R	6-pin FSIC with Schlage logo
M	Everest SL FSIC, 7-pin (A2 pinning) with Schlage logo
J	Less FSIC
F	6-pin FSIC less Schlage logo
T	Refundable FSIC construction core

Small format interchangeable core (SFIC) mortise cylinder options	
G	7-pin SFIC (A2 pinning) with Schlage logo
B	Less SFIC
BDC	Disposable SFIC construction core
H	Refundable SFIC construction core

SPECIFICATIONS

Chassis	
Case material	Cold Rolled Steel (CRS) with zinc dichromate plating
Case size	L9000 Series: 4-7/16" x 6-1/16" x 1" (113 mm x 154 mm x 25 mm) L400 Series: 4-7/16" x 3-5/8" x 1" (113 mm x 92 mm x 25 mm)
Spacing	Knob or lever to cylinder: 3-7/8" (98 mm); Knob or lever to thumbturn hub: 2-11/16" (68 mm)
Door thickness	Standard: 1-3/4" (44 mm) Optional: 1-3/8" (35 mm) Over 1-3/4" (44 mm) specify door thickness and position in door EE, EI, EO, ED
Backset	2-3/4" (70 mm) only

Trim	
Handing	L9000 Series: Field-reversible without disassembly L400 Series: Non-handed
Lever/knob	**33 lever designs (see pages 2-5):** Forged brass and cast stainless steel **Two knob designs (see page 5):** Heavy-duty wrought brass or stainless steel Ligature resistant lever (SL1) and knob (SK1), High Security Ligature Resistant (HSLR) trim, HL6 hospital latch Tactile warning applied to outside lever; available on 01, 02, 03, 05, 06, 07, 12, 17, 18, M51, M52, M81, ME1, ME2, ME3 lever designs
Rose/ escutcheon	L escutcheons: 7-15/16" x 1-3/4" x 7/16" (202 mm x 44 mm x 11 mm); cold-forged brass and stainless steel N escutcheons: 7-7/8" x 2-1/2" x 7/16" (200 mm x 64 mm x 11 mm); heavy-wrought, reinforced brass and stainless steel Roses: A, B, C: wrought brass and stainless steel; AVA and MER: forged brass
Finishes	14 available: 605, 606, 609, 612, 613, 619, 622, 625, 626, 626AM, 643e
Combinations	Available with knob both sides, lever both sides, or knob/lever combinations. Roses cannot be combined with escutcheons.

Latches, Armors, & Strikes	
Armor	**L9000 Series:** Standard: 1-1/4" x 8" x 7/32" (32 mm x 203 mm x 6 mm) Optional: 1-1/16" x 8" x 7/32" (27 mm x 203 mm x 6 mm) **L400 Series:** Standard: 1-1/4" x 5-9/16" x 7/32"(32 mm x 141 mm x 6 mm)
Latch	3/4" (19 mm) throw stainless steel latch with anti-friction tongue
Deadbolt	1" (25 mm) throw stainless steel deadbolt
Strike	**L9000 Series:** Standard: ANSI curved lip strike 1-1/4" x 4-7/8" (32 mm x 124 mm) x 1-3/16" (30 mm) lip with dust box; Optional: Extended lip strike options (7/8", 1", 1-1/2", 1-3/4", 2") **L400 Series:** Standard: 1-1/8" x 3-1/2" (29 mm x 89 mm) with dust box; Optional: 1-1/4" x 4-7/8" (32 mm x 124 mm) with dust box

Keying	
Cylinder format	6-pin Conventional mortise cylinder (standard); also available in concealed mortise cylinder, FSIC, SFIC and 7-pin SL cylinder formats plus less cylinder options. Two nickel silver cut keys per lock.
Keyway	Patented Everest 29 S123 (standard); also available in open, restricted, and Primus XP security levels with available master keying and construction keying.

SPECIFICATIONS

Wired electrified	
Input voltage	12V or 24V DC
Operating mode	Fail Safe or Fail Secure via switch on chassis
Peak current	12V operating voltage: 1A 24V operating voltage: 0.4A
Holding current	0.1 amp
Request to Exit	Modular option on L909X and L949X electrified functions (when ordering or added in field) Rating: 3A @ 125V AC/2A @ 30V DC Available on all L909x and L949x electrified functions. Also available option for the following mechanical functions: L9010/25/26/50/56/70/71/80 and L9453/56/58/65/66/80/85/96.
Latch bolt monitor	Available on all L909x and L949x electrified and L9010/25/26/50/56/70/71/80/82 and L9453/56/65/66/80/85/96 mechanical functions.
Door position sensor	Internal available on L909x electrified and L9010/25/26/80/82 mechanical functions; external available on all functions
Deadbolt monitor	Standard on L949x electrified and available on L9453/56/57/58/80/85/96 mechanical functions

Warranty	
	3-year limited mechanical and 1-year limited electromechanical

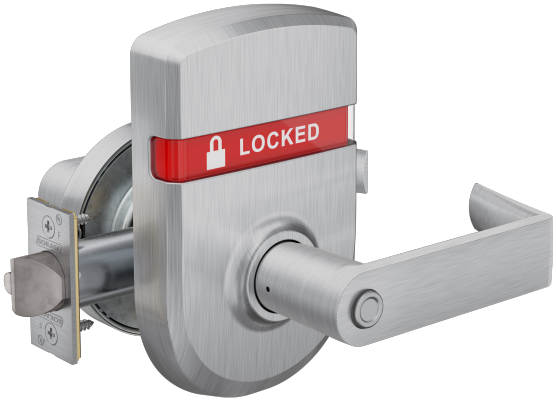
Certifications	
ANSI/BHMA	**L/LV9000:** ANSI/BHMA A156.13-2017 Series 1000, Grade 1 Operational and Security **With FSIC Interchangeable Core Cylinders:** Grade 1 Operational, Grade 2 Security **With SFIC Interchangeable Core Cylinders:** Grade 1 Operational, Grade 3 Security **L400:** ANSI/BHMA A156.36-2010, Grade 1
ICC	Complies with ICC A117.1 Accessible and Usable Buildings and Facilities
UL/cUL	UL 10C and CAN/ULC-S104 3-hour fire door (except L9076 and L9077) Electrified functions are UL/ULC Listed for single-point locking applications UL 437 Listed when using UL 437 Primus cylinder UL Listed for 3-Hour fire door (except L9076 and L9077) L400 UL Listed Auxiliary Lock for 3-hour fire door
UL 294	UL 294 Access Control Performance Levels: Destructive Attack, Level 1; Line Security, Level 1; Standby Power, Level 1; Endurance, Level IV (with DM, or LX, Endurance, Level I). ULC-S319 Class III (L909x and L949x functions only)
CA Fire Code	All levers with a return to door of 1/2" (13 mm) or less comply (Formerly Title 19, California State Fire Marshal Standard)
Building codes	Miami-Dade NOA and Florida Building Commission listings Texas Department of Insurance (TDI) for impact and non-impact applications
Federal	BAA compliant, all functions

© 2024 Allegion plc
013141, Rev. 06/24

ND Series

Grade 1 Cylindrical Locks





OVERVIEW

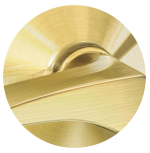
Beyond Grade 1 performance is the hallmark of the mechanical and electrified ND Series locks. These locks are put through extreme levels of testing and are proven to withstand 3,100 in-lb. of abusive lever torque-more than 2-1/2 times the Grade 1 standard requirement. Offset lever pull testing up to 1,600 lbs. assures you of the lock's superb resistance against pry bar attacks. More than strong, ND Series is built to last and shows nearly zero droop or wobble after 16 million cycles.

All ND Series locks including electronic functions, ligature-resistant trims, and ground-breaking, high-visibility status indication trims use the common cylindrical ANSI 161 door preparation making them easily interchangeable. They are ideal for all new construction and retrofit applications where Grade 1 strength and security are desired.

FINISHES



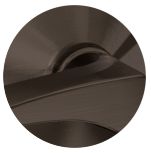
605
Bright Brass



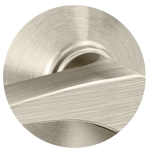
606
Satin Brass



612
Satin Bronze



613
Oil Rubbed Bronze



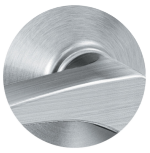
619
Satin Nickel



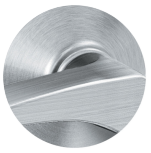
622
Matte Black



625
Bright Chrome



626
Satin Chrome



626AM
Satin Chrome Antimicrobial



643e[1]
Aged Bronze

1. e = an equivalent finish to the BHMA standard

LEVER STYLES



ATH (Athens)
8AT - Milled tactile warning



BRK (Boardwalk)
8BK - Knurled tactile warning



BRW (Broadway)
8BY - Knurled tactile warning



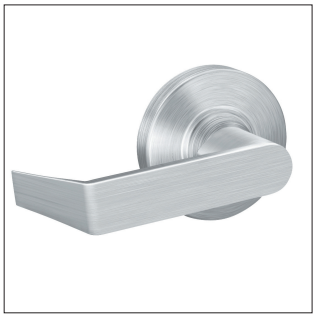
LAT (Latitude)
8LT - Milled tactile warning



LON (Longitude)
8LN - Milled tactile warning



OME (Omega)



RHO (Rhodes)[1]
8RO - Milled tactile warning[1]



SPA (Sparta)
8SP - Milled tactile warning

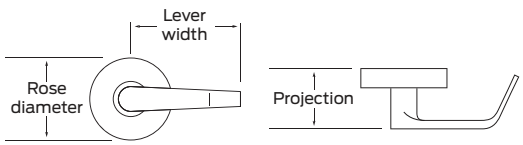


TLR (Tubular)
8TR - Knurled tactile warning

Dimensions		
Lever	**Width**	**Projection**
ATH (Athens)	4.56"	3.31"
BRK (Boardwalk)	4.94"	3.06"
BRW (Broadway)	4.50"	3.06"
LAT (Latitude)	4.50"	3.13"
LON (Longitude)	4.94"	3.13"
OME (Omega)	5.06"	3.31"
RHO (Rhodes)	4.56"	2.94"
SPA (Sparta)	4.94"	3.56"
TLR (Tubular)	4.94"	3.00"

Rose	Diameter
Standard	3.44"

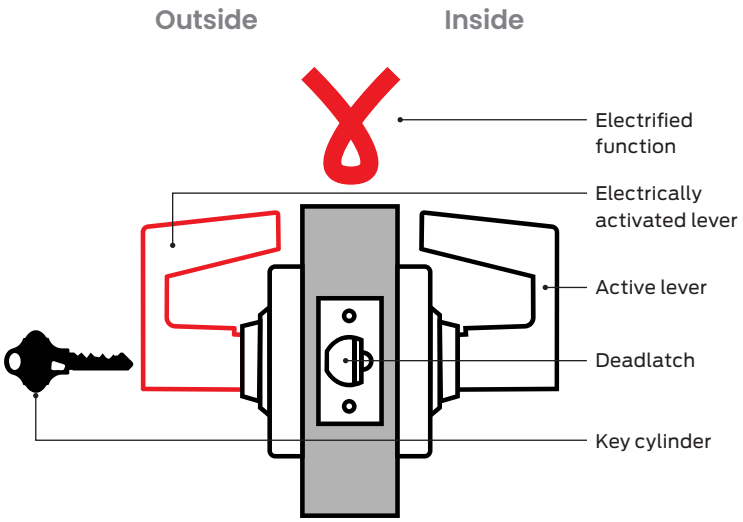
Return to door meets 1/2" requirement for Boardwalk (BRK), Longitude (LON), Omega (OME), Rhodes (RHO), Sparta (SPA) and Tubular (TLR) levers



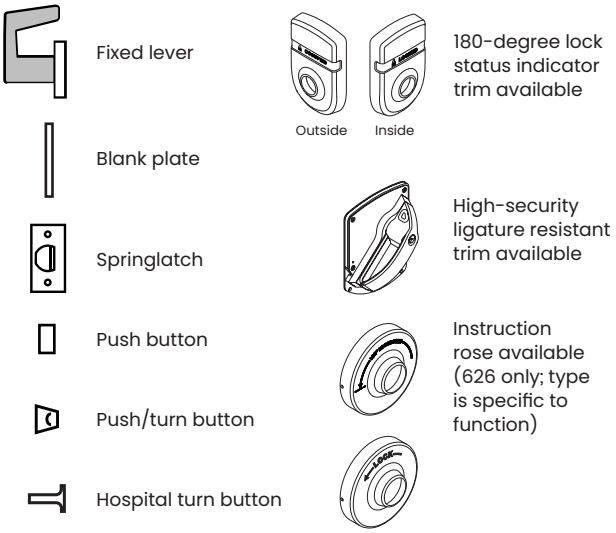
1. Optional break-away feature available on Rhodes levers for most locking functions. This allows the handheld part of the lever to break away from the shank when extreme torque is applied protecting the spring cage and locking mechanism from exterior access to help prevent unauthorized break-in.

MECHANICAL LOCK FUNCTIONS

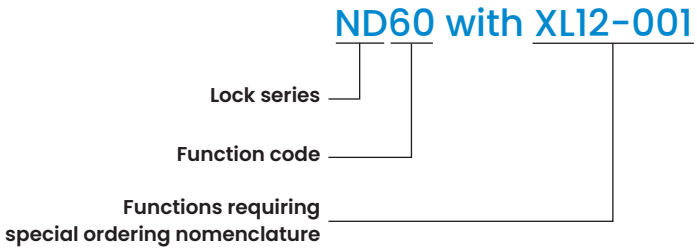
Legend

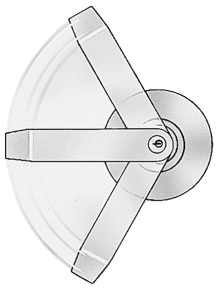


Key



Product Identification Guide



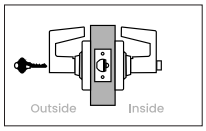


Vandlgard® functions.

Some functions feature Vandlgard locked lever protection. It allows the outside lever to rotate freely up and down when locked to limit the ability of vandals to apply excessive force to the chassis helping to prevent damage to internal components.

MECHANICAL KEYED FUNCTIONS

Schlage **ANSI**
ND73 **F90**

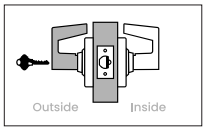


Corridor lock



- Lever with key cylinder outside; push button in lever inside; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by pushing button on inside lever or by key outside
- **When locked by pushed button:** rotating inside lever retracts latch and releases button unlocking outside lever; closing door also unlocks preventing lock-out
  When locked by key: rotating inside lever retracts latch but outside lever remains fixed until unlocked by key outside
- Inside lever always free for immediate egress

Schlage **ANSI**
ND80 **F86**



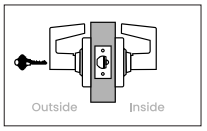
Storeroom lock



- Lever with key cylinder outside; lever inside; deadlatch
- Outside lever always fixed; latch retracted by inside lever
- Key in outside lever retracts latch only
- Inside lever always free for immediate egress

To order configured with Request to Exit (RX), specify RX under special options.

Schlage **ANSI**
ND81 **F86**



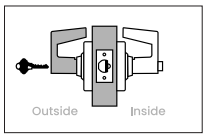
Accessible storeroom lock



- Lever with key cylinder outside; lever inside; deadlatch
- Outside lever is always fixed when key is not present; latch retracted by inside lever
- Key outside turned counter-clockwise retracts latch; 180-degree clockwise rotation of key allows outside lever to retract latch
- Inside lever always free for immediate egress

To order configured with Request to Exit (RX), specify RX under special options.

Schlage **ANSI**
ND85 **F93**



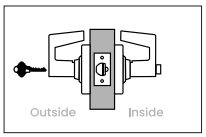
Faculty restroom lock

- Lever with conventional indicator cylinder outside; push button in lever inside; deadlatch
- Entrance by key only; outside lever always fixed; latch retracted by inside lever
- Push button on inside lever activates a locking pin that extends from the cylinder face to prohibit use of operating keys and indicate that the room is in use
- Turning inside lever or closing door releases the locking pin and push button to allow normal use of operating keys
- Emergency unlock: use of an emergency key (sold separate) is required to override the locking pin and unlock from the outside when push button is activated
- Inside lever always free for immediate egress

Note: Available with Conventional KIL indicator cylinder only. To order a spanner key to enable lockout feature use part number 35-251.

To order an emergency key use part number 35-102.

Schlage **ANSI**
ND91 **F82**



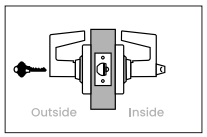
Vandlgard® entrance/office lock



- Lever with key cylinder outside; push button in lever inside; deadlatch
- In unlocked state latch is retracted by either lever
- Outside is made inoperative by pushing button on inside lever; key outside does not lock, Vandlgard® allows outside lever to rotate freely when locked
- Key outside or rotating inside lever retracts latch and releases button unlocking outside lever
- Inside lever always free for immediate egress

Note: Locks ordered with indicator trim fit 1-3/4" doors. Sold separate shim components allow application to doors 1-3/8" to 1-3/4".

Schlage **ANSI**
ND92 **F109**



Vandlgard® entrance lock



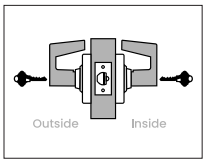
- Lever with key cylinder outside; push/turn button in lever inside; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by pushing button or pushing and turning button on inside lever; key outside does not lock, Vandlgard® allows outside lever to rotate freely when locked
- **Pushed button unlocking:** key outside or rotating inside lever retracts latch and releases button unlocking outside lever
  Pushed/turned button unlocking: key outside or rotating inside lever retracts latch but does not unlock outside lever; rotate inside button to start position to allow button release and unlocking by key or by rotating inside lever
- Inside lever always free for immediate egress

Caution: Egress without fully releasing the push/turn button can result in lock-out situations.

Note: Locks ordered with indicator trim fit 1-3/4" doors. Sold separate shim components allow application to doors 1-3/8" to 1-3/4".

MECHANICAL KEYED, DOUBLE CYLINDER FUNCTIONS

Schlage **ANSI**
ND82 **F87**



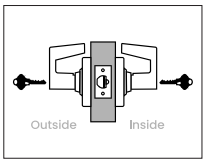
Institution lock



- Lever with key cylinder both sides; deadlatch
- Both levers are always fixed
- Key in either lever retracts latch only

Caution: Double cylinder locks on any door, in any structure which is used for egress are a life safety hazard in times of emergency and their use is not recommended. Installation should be in accordance with existing codes only.

Schlage **ANSI**
ND93 **F88**



Vandlgard® vestibule lock

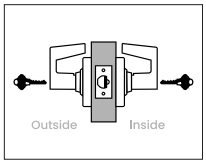


- Lever with key cylinder both sides; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by key inside; key outside does not lock; Vandlgard® allows outside lever to rotate freely when locked
- Key outside retracts latch but cannot unlock outside lever; only key inside unlocks
- Inside lever always free for immediate egress

Note: Available with optional instruction rose identifying key rotation direction for rapid lockdown. 626 finish only.

To order with instruction rose specify function and note XN12-035 as a special option.

Schlage **ANSI**
ND98 **F110**



Vandlgard® classroom security lock (180-degree lockdown)



- Lever with key cylinder both sides; deadlatch
- In unlocked state latch is retracted by either lever
- Outside lever is made inoperative by rotating key in either lever 180 degrees counter-clockwise and returning to start position; Vandlgard® allows outside lever to rotate freely when locked
- Unlock outside lever by rotating key 180 degrees clockwise in either lever and returning to start position
- Inside lever always free for immediate egress

Locks ordered in 626 finish come standard with instruction rose (47342586) identifying key rotation direction for rapid lockdown. Other finishes receive a standard rose.

Note: Locks ordered with indicator trim fit 1-3/4" doors. Sold separate shim components allow application to doors 1-3/8" to 1-3/4".

CYLINDERS

Conventional cylinder	
P	6-pin Conventional (keyed 5)
P6	6-pin Conventional (standard)
Z	SL 7-pin Conventional (A2 pinning)
L	Less Conventional
C	Less 6-pin Conventional double cylinder

Full size interchangeable core (FSIC)	
R	6-pin FSIC
M	SL 7-pin FSIC (A2 pinning)
J	Less FSIC
T	Refundable FSIC construction core

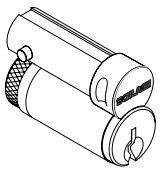
Small format interchangeable core (SFIC)	
G	7-pin SFIC (A2 pinning)
B	Less SFIC
BDC	Disposable SFIC construction core
H	Refundable SFIC construction core

SPECIFICATIONS

Chassis	
Material	Modular design of zinc and steel components plated for corrosion protection
Door thickness	**Standard:** 1-5/8" (41 mm) to 2-1/8" (54 mm) **Optional:** 1-3/8" (35 mm) - 6" (152 mm) EE, EO, EI, ED configurations
Handing	Non-handed
Trim	
Levers	**Standard:** Pressure cast zinc, plated to match product finish specification in nine designs - Athens (ATH), Boardwalk (BRK), Broadway (BRW), Latitude (LAT), Longitude (LON), Omega (OME), Rhodes (RHO), Sparta (SPA), and Tubular (TLR) **Optional:** Tactile feature available on all designs, specify 8AT, 8RO, 8SP, 8TR, 8LT, 8LN, 8OM, 8BY, or 8BK
Rose/escutcheon	Wrought brass or zinc, plated to match product finish specification
Finishes	**Nine available:** 605, 606, 612, 613, 619, 622, 625, 626, 643e; optional antimicrobial coating is available on 626–order as 626AM
Latch	
Backset	**Standard:** 2-3/4" (70 mm) **Optional:** 2-3/8", 3-3/4", 5" (60, 92, 127 mm)
Latch bolt	**Standard:** 1/2" (12 mm) throw spring latch or deadlatch (Stainless Steel) **Optional:** 3/4" (19 mm) throw anti-friction deadlatch available for pairs of doors
Strike	**Standard:** ANSI curved lip: 1-1/4" x 4-7/8" x 1-3/16" (32 mm x 124 mm x 30 mm) **Optional:** T Strike, ANSI strikes with alternative lip lengths, dust box options
Keying	
Formats	**Standard:** 6-pin Conventional cylinder with two patented keys **Optional:** FSIC, SFIC, and 7-pin SL cylinder formats plus less cylinder options made to fit non-Schlage cylinders from Best, Corbin Russwin, Medeco, Sargent and Yale
Access security	**Standard:** 6-pin, patented Everest 29 S123 keyway **Optional:** Open, restricted, Primus®, master keying, and construction keying
Wired electrified	
Input voltage	Autodetecting 12-24V DC, +/- 10%
Operating mode	Fail safe or fail secure via switch on chassis
Current draw	0.23 amps maximum; 0.01 amps holding
Request to Exit	Modular - 3A @ 125VAC / 2A @ 30VDC
Warranty	
	10 years mechanical, 1 year wired electrified
Certifications	
ANSI/BHMA	All ND Series comply with A156.2-2011, Series 4000 Grade 1 cylindrical locks; Wired electrified complies with A156.25 (indoor)
ICC	Complies with ICC A117.1 Accessible and Usable Buildings and Facilities
UL/cUL	UL 10C and CAN/ULC-S104; All locks 3-hour A label single fire door 4'0" x 10'0"; pair doors 3-hour fire door 8'0" x 8'0" with 3/4" latch option; pair doors 90-minute fire 8'0" x 10'0" with 3/4" latch option
CA Fire Code	All levers with a return to door of 1/2" (13 mm) or less comply (Rhodes, Sparta, Tubular, Omega, Longitude and Boardwalk)
FL Building Code	Complies with Florida Building Code (ASTM E330, E1886, E1996) and Miami Dade (TAS 201, 202, 203) requirements for hurricanes
Federal	Meets FF-H-106C Series 161 BAA compliant, all functions

© 2024 Allegion plc
013158, Rev. 02/24

Full Size Interchangeable Core Cylinders for Schlage Locksets



Full Size Core Only

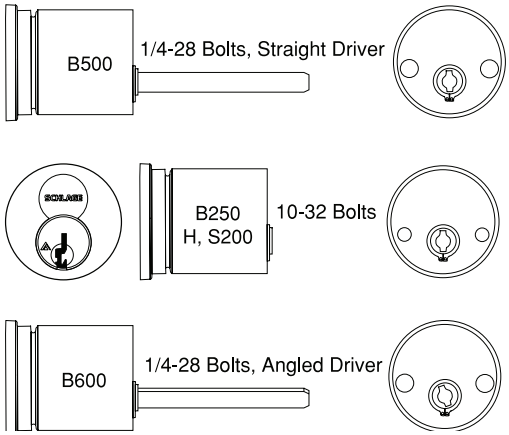
Number	Mechanism
23-030	Conventional core
30-120	Conventional core for hotel function (specify hand)
20-740-XP	Primus XP core (not available in hotel function)

Available 606 and 626 finish only. Order control keys separately.

Full Size IC Housings for Bored Deadlocks, Less Core

Lockset Series	Description	Number	Specify Finish
B500-Series	Outside	B610-203, B610-205	605, 609, 612, 613, 619, 625, 626, and 716
	Inside	B610-028**	605, 609, 612, 613, 619, 625, 626, and 716
B250, H, S200-Series	Outside	22-061	605, 606, 609, 610, 611, 612, 613, 616, 625, 626
	Inside of B252	22-062	
B600 / 700-Series	Outside	B610-027	605, 606, 609, 612, 613, 625, 626
	Inside	B610-028	See Note Below

Specify finish of B610-031 inside snap-on faceplate ordered separately for BC162 and B662/762.
**Inside housing does not include snap-on faceplate

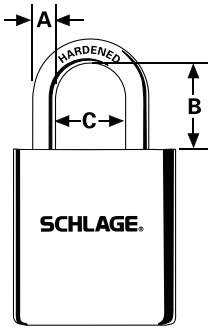




KS43F KS72F KS92M

Full Size Interchangeable Core Padlocks

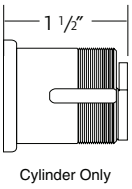
Part #	Shackle Dimensions		
	A	B	C
LESS CYLINDER - FULL SIZE INTERCHANGEABLE CORE			
BRASS BODY			
KS43A3200	3/8″	3/4″	3/4″
KS43D3200	3/8″	1 1/2″	3/4″
KS43F3200	3/8″	2″	3/4″
KS43G3200	3/8″	4″	3/4″
STEEL BODY			
KS72M3200	7/16″	1″	7/8″
KS72F3200	7/16″	2″	7/8″
KS92M3200	3/8″	1″	3/4″



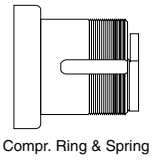
Note: To order Primus XP add the suffix - XP to the Primus part number. (Example: 12-345-XP)

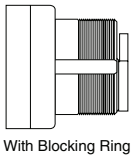
Full Size Interchangeable Core Mortise Cylinders





Cylinder Only


Compr. Ring & Spring


With Blocking Ring



Cylinders for Schlage L-Series Mortise Locks

	Design	Function	Core Mechanism		
			Conventional	Primus, Primus XP	Housing Less Core
	**L & N Escutcheons** (cylinders with compression ring)	All Except Below	30-008	20-798, 20-798-XP	30-007
		L9060P Outside	30-030	20-782, 20-782-XP	30-032 + 36-083
		L9485P, L9486P Hotel Funtions	30-010*	N/A	30-007
	**Sectional Trim** (cylinder with compression ring, spring and 3/8" blocking ring). 9060 requires 1/2" blocking ring.	All Except Below	30-138	20-776, 20-776-XP	30-137
		L9060P Outside	30-030 + 36-083 + 35-082-030	20-783, 20-783-XP	30-032 + 36-083 + 36-082-050
		L9485P, L9486P Hotel Funtions	30-040*	N/A	30-137

* Hotel function cores are handed. Specify hand of door.



L583-489
Cam for All Functions Except L9060 Outside



K510-680
Cam for L9060 Outside

Mortise Cylinders with Straight Cam for Exit Devices

Number	Core Mechanism	Collar
26-091	Conventional core	Compression ring & spring
20-061		3/8" blocking rings + compression ring & spring
20-763, 20-763-XP	Primus/Primus XP core	Compression ring & spring
20-771, 20-771-XP		3/8" blocking rings + compression ring & spring
20-059	Housing less core	None
26-064		Compression ring & spring



K510-730
Straight Cam, Other Applications

Notes 1. Available 605, 606, 609, 610, 612, 613, 625, and 626 finish. Cores furnished 606 and 626 only.
2. To differentiate between Classic and Everest, specify keyway. Example: C or CP (Classic), C123 (Everest). Everest C123 keyway standard.
3. All cylinders are 1 1/2" long.
4. Specify LKB if 0-bitted Primus XP cylinders are required less key blanks.

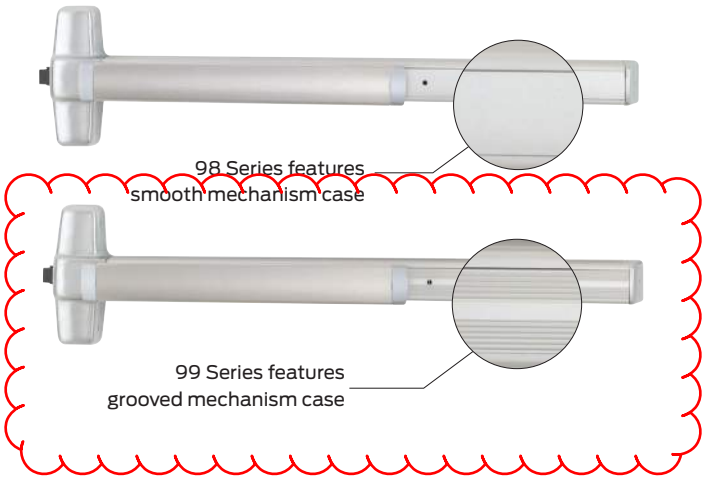
VON DUPRIN®

Exit device

98/99 Series

Overview

The 98/99 Series devices are heavy-duty push pads. The 98 Series has a smooth mechanism case, while the 99 Series has a grooved mechanism case. The 98/99 Series has been certified to the highest industry standards and are used in schools, hospitals and government buildings.



Device types



Rim device



75 Mortise lock device



27 Surface mounted vertical rod device [1]



47 Concealed vertical rod device, 5/16" throw [1]

48 Concealed vertical rod device, 5/8" top, 1 1/2" bottom throw



47WDC Concealed vertical rod wood door device [1]



49 Concealed vertical cable device [2]



50WDC Concealed vertical cable wood door device



57 Three-point latch device

[1] Also available less bottom rod (LBR)
[2] Also available less bottom latch (LBL)

ALLEGION™

VON DUPRIN®

Exit device
98/99 Series

Finishes



605
Bright Brass



606
Satin Brass



612
Satin Bronze



619
Satin Nickel



622
Matte Black

625
Bright Chrome



626
Satin Chrome



626AM
Satin Chrome, Antimicrobial



628
Aluminum, Clear Anodized



630
Satin Stainless



630AM
Satin Stainless, Antimicrobial



643e
Aged Bronze



693
Black



710
Dark Brown, Anodized

Due to the many variations in monitors and printers, color samples may appear different than the physical product. Contact your local sales representative for a physical color sample.

ALLEGION™

ALLEGION

VON DUPRIN®

996L-KC

Lever key capture trim



Overview

996L-KC lever key capture trim allows for single-handed entry while incorporating the patented vandal-resistant trim design.

The trim is unlocked using a 180 degree key turn, upon which the key becomes captured in cylinder. This operation allows the lever to become active and used to open the door. When the key is then rotated to a maximum 180° in the reverse direction, the key can be removed, and the lever returns to a rigid/locked state.

The vandal-resistant breakaway feature engages when more than 35 lbs. of torque pressure is applied to the locked lever. In breakaway mode, the lever dangles, internal components are protected from breakage, and the trim remains locked. Lever position is restored simply by pulling up on the lever.

The 996L-KC trim is compatible with most 98/99 device configurations with the exception of 75 mortise locks.

The 996L-KC trim can be ordered with a device, or a conversion kit can be purchased as a standalone product to be retrofitted to an existing 996L trim.

Features and benefits

- Vandal-resistant breakaway lever
- Allows for single-handed operation
- Compatible with most device configurations, except for 75 mortise locks
- Field retrofit kits work for 996L
- Field-reversible handing

To order, specify:

- 996L-KC
- Lever style: 06 lever is furnished standard if not specified
- Handing: RHR or LHR (RHR is furnished standard if not specified; field reversible)
- Finish: 605, 606, 612, 613, 619, 622, 625, 626, 643e, 693, 695
- When ordering with device, specify device type + 996L-KC, example: 98LX 996L-KC
- When ordering conversion kit, specify part number 47683326

Note: For more ordering details, please reference Von Duprin catalog and price book.

Allegion, the Allegion logo, Von Duprin and the Von Duprin logo are trademarks of Allegion plc, its subsidiaries and/or affiliates in the United States and other countries. All other trademarks are the property of their respective owners.

About Allegion

Allegion (NYSE: ALLE) is a global pioneer in seamless access. We keep people and their assets safe, wherever they are, bringing together simple solutions, convenient access and advanced technology.

For more, visit **www.allegion.com**

KRYPTONITE ■ LCN ■ SCHLAGE ■ STEELCRAFT ■ VON DUPRIN

ALLEGION™

©2023 Allegion
015608, 02/23
www.allegion.com/us

VON DUPRIN®

Exit device
98/99 Series

Trim styles



990



996



696



697
3/4" (19mm) diameter pull



392-7



HL



374



VR910



VR914

Dimensions

Trim style	Width	Height	Thickness	Projection
990	3"	14 3/16"	3/32"	2"
996 Knob	2 3/4"	10 3/4"	27/32"	3 1/4"
996 Lever	2 3/4"	10 3/4"	27/32"	2 7/8"
696	1 5/8"	13 1/2"	3/16"	2 1/16"
697	1 5/8"	13 1/2"	3/16"	3"
392-7	3/4" inch round stainless steel with 7" center to center that matches the 98/99 center case. 3 1/2" offset with 1 1/2" clearance.			
HL	2 9/16"	7 7/8"	-	2 5/8"
374	2 3/4"	10 3/4"	27/32"	
VR910/914 with RIM/verticals	5 1/2"	11"	-	
VR910/914 with mortise	7 1/4"	11"	-	

ALLEGION™

Lever styles

Standard levers



01



02
- Knurling available



03
- Knurling available



05



06
- Default lever
- Suites with Schlage Rhodes
- Knurling available



07
- Suites with Schlage Athens



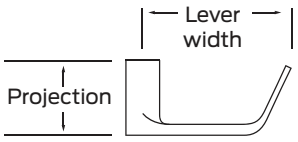
12
- Handed



16
- Suites with Schlage Omega

Dimensions

Lever	Width	Projection
01	4.0"	2.1"
02	4.75"	2.3"
03	4.75"	2.813"
05	3.75"	2.8"
06	4.7"	2.1"
07	4.6"	2.3"
12	4.3"	2.9"
16	5.05"	2.66"



Mechanical device options

Dogging

CD — **Cylinder dogging, panic only**

CD-CX — **Center case cylinder dogging for Chexit devices**

CI — **Cylinder dogging indicator**
- Battery-operated dogging indicator in cylinder format with red light visible from over 75 feet away

DI — **Dogging indicator**
- Battery-operated dogging indicator in hex format with red light visible from over 75 feet away

LD — **Less dogging**

SD — **Special center case dogging**
- Center case cylinder dogging

Classroom security

-2 — **Double cylinder**
- Inside key cylinder locks/unlocks outside trim

-2SI — **Double cylinder with security indicator**
- Inside key cylinder locks/unlocks outside trim with visible indicators that provide status of door

CDSI — **Cylinder dogging with indicator**
- Provides visible lock/unlock indicators showing whether device is dogged or undogged

HDSI — **Hex dogging with indicator**
- Provides visible lock/unlock indicators showing whether device is dogged or undogged

Environmental

PN — **Pneumatic latch retraction**
- For areas where electrical devices banned
- Special linkage for mechanical or pneumatic dogging

QM — **Quiet mechanical option**
- Provides damper-controlled relatching of device

INS — **Insulclad kits**
- Kits with longer fasteners or parts for Insulclad doors

AM — **Anti-microbial finish**

Weatherized

WH — **Weep holes**
- Drainage (weep) holes in mechanism case

WS — **Windstorm**
- Severe weather certified/tested
- FEMA and ICC compliant
- Tornado and hurricane tested

California code

AX — **Accessible device**
- UL certified to meet new 5 lb. maximum operating force requirement
- Exceeds ANSI/BHMA requirements

Latches

PL — **Pullman latch**
- Latches are always extended
- Most commonly used in conjunction with electric strikes and LBR-less bottom rod application

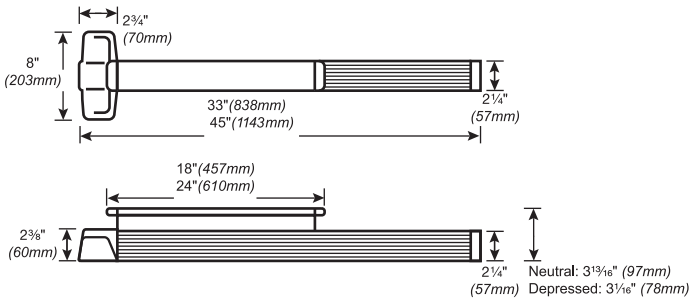
VON DUPRIN®

Exit device
98/99 Series

Specifications

Accessibility	▪ Force to depress push pad – AX device: 5 lbs – Standard device: 15 lbs ▪ Push pad projection – Neutral: 3 13/16" (97 mm) – Depressed: 3 1/16" (78 mm)
Certifications/ approvals	All Von Duprin 98/99 exit devices are ANSI/BHMA Certified. Please refer to the BHMA Certified Products Directory for specific listings.
Mounting height	39 13/16" (1011 mm) 39 11/16" (1008 mm) with mullion
Warranty	36 months from the date of placing the product in operation

Dimensions



© 2019 Allegion
013139, Rev. 11/2019
www.allegion.com/us

ALLEGION™

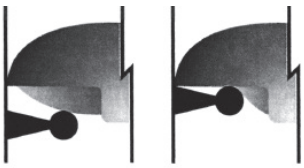
Mechanical options

AX Accessible device

The AX device is a UL certified exit device designed to meet the progressive requirements of the California Building Code for accessible openings. This device meets the 5 lbs of operating force requirement called for in chapter 11B-309.4. The AX device also exceeds ANSI/BHMA requirements. Available devices include: AX98/99, AX98/99-F, AX98/9949LBL, AX98/9949-F LBL, AX98/9949-F LBLAFL. Additionally, all AX devices will be shipped with a new UL label clearly stating “Meets California building Code (2013) Sec. 11B-309.4” and an “AX” identifier label on device center case. See images below for reference.



XP Extra performance



For increased security the XP98/99 Rim exit device has a static load force resistance of more than 2,000 pounds, twice that of standard rim exit devices. The two-piece latch bolt forms a 90° latch-to-strike contact. The “smart” latch changes shape when subjected to external forces. This design enables the exit door to withstand an external attack and remain secure. Additionally, the patented latch bolt design provides a greater, longer-lasting latch bolt to strike contact which is not easily affected by the twisting motion of a weakened frame, resulting in an opening that will remain strong.

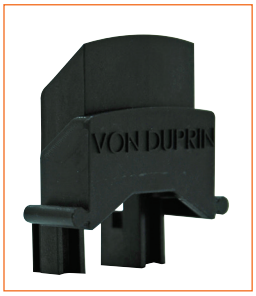
With a door loaded to 250 pounds, XP98/99 requires less than 40 pounds of pressure to open, 25% less than the safety code requires.

XP98/99 is available for panic or fire exit hardware applications. Dimensions, finishes and trim options are equal to the standard 98/99 series rim exit device.

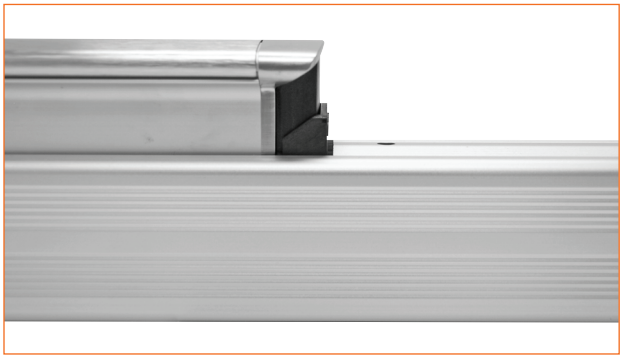
Note: The 909 strike is to be used for all applications.
The exception occurs with the use of fire rated double door applications, in this instance the 954 strike is required.

PA Pushpad armor

Built to absorb impact, the pushpad armor stands up to the wear and tear of demanding high-traffic areas. This composite accessory provides added support, while protecting the pushpad on the hinge side of the device. Available for 33A/35A and 98/99 series exit devices. See images below for reference.







2720 Tobey Drive, Indianapolis, IN 46219
Tel 1-877-671-7011 ▪ Fax 800-851-0000
Zero.Customer.Support@allegion.com
www.zerointernational.com

Part No: 142 Rain drip

Part description: Accessories & options

Notes:

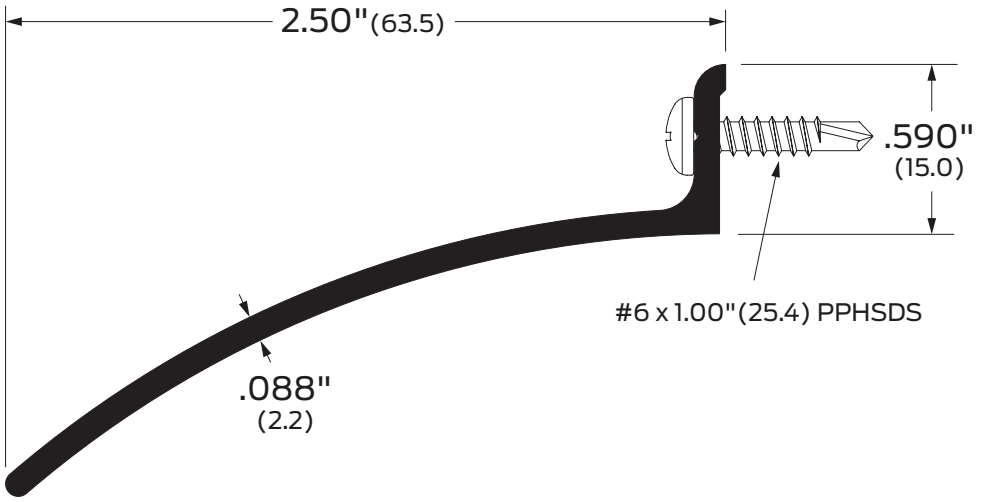
Provided by:

Customer name:

Job no:

Date:

Image may not be shown to scale



Certifications:
- Fire rated-UL10c

ANSI/BHMA:
142AA, 142BK, 142D, 142G R3Y976

BHMA CERTIFIED

Finishes:

AA	Aluminum clear anodized
BK	Aluminum black anodized
D	Aluminum dark bronze anodized
G	Aluminum gold anodized

Options:

SEC	Security screws

© 2018 Allegion · 012650, Rev. 11/18 · **www.allegion.com/us**

2720 Tobey Drive, Indianapolis, IN 46219
Tel 1-877-671-7011 ▪ Fax 800-851-0000
Zero.Customer.Support@allegion.com
www.zerointernational.com

Part No: 328

Part description: Head & jamb gasketing, door sweep, meeting stile

Notes:

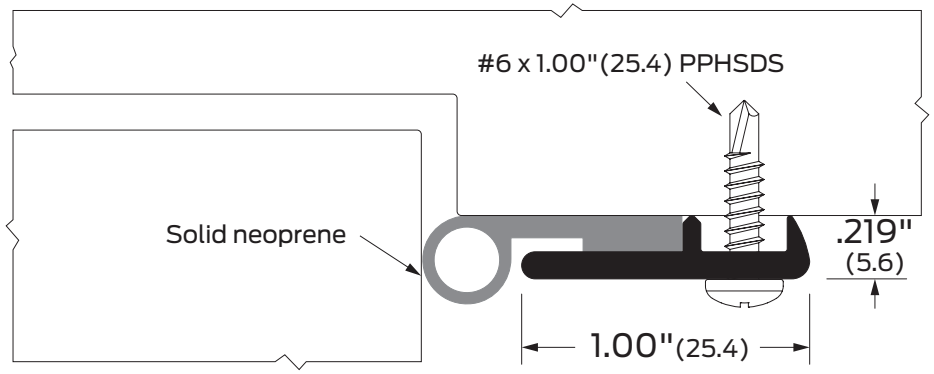
Provided by:

Customer name:

Job no:

Date:

Image may not be shown to scale



Notes:
ZAG option for mental health applications includes security screws

Certifications:

- Fire rated-UL10c
- Smoke and draft control (as head & jamb, door sweep)
- Air Infiltration (as head & jamb)
- Sound

ANSI/BHMA:

328AA, 328BK, 328D, 328G — R3B164 , R3B434, R3B735
328B — R1B164, R3B434

BHMA CERTIFIED

Finishes:

AA	Aluminum clear anodized
BK	Aluminum black anodized
D	Aluminum dark bronze anodized
G	Aluminum gold anodized
B	Bronze, architectural mill finish
B-ORB	Oil-rubbed bronze

Options:

ZAG	Ligature resistant gasketing
S	Order as a set
SEC	Security screws

© 2018 Allegion · 012740, Rev. 1/19 · **www.allegion.com/us**

2720 Tobey Drive, Indianapolis, IN 46219
Tel 1-877-671-7011 ▪ Fax 800-851-0000
Zero.Customer.Support@allegion.com
www.zerointernational.com

Part No: 429

Part description: Head & jamb gasketing

Notes:

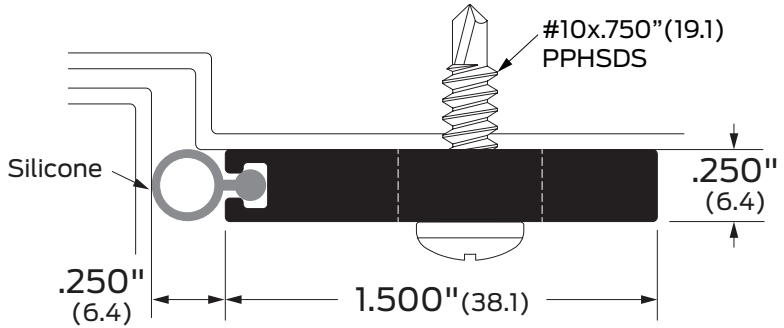
Provided by:

Customer name:

Job no:

Date:

Image may not be shown to scale



Notes:
Gasketing protection for closer bracket or door coordinator.

Certifications:

- Fire rated-UL10c
- Smoke and draft control

ANSI/BHMA:

429AA, 429BK, 429D, 429G R3E164

BHMA CERTIFIED

Finishes:

AA	Aluminum clear anodized
BK	Aluminum black anodized
D	Aluminum dark bronze anodized
G	Aluminum gold anodized

Options:

S	Order as a set
SEC	Security screws

© 2018 Allegion · 012741, Rev. 1/19 · **www.allegion.com/us**

2720 Tobey Drive, Indianapolis, IN 46219
Tel 1-877-671-7011 ▪ Fax 800-851-0000
Zero.Customer.Support@allegion.com
www.zerointernational.com

Part No: 488S

Part description: Self-adhesive weatherstripping

Notes:

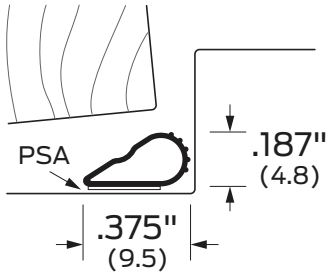
Provided by:

Customer name:

Job no:

Date:

Image may not be shown to scale



Notes:
PSA standard.

Certifications:
- Fire rated-UL10c
- Smoke and draft control

ANSI/BHMA:
488S R0E154

BHMA CERTIFIED

Finishes:
- **BK** Black
- **BR** Brown
- **CL** Clear
- **GY** Gray
- **WH** White

Options:
- **ZAG** Ligature resistant gasketing

© 2018 Allegion · 012815, Rev. 11/18 · **www.allegion.com/us**

SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Monolithic Glazing units.

B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 08 8300 - Mirrors.

D. Section 10 2800 - Toilet Accessories: Mirrors.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

F. ASTM C1036 - Standard Specification for Flat Glass.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

H. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.

I. ASTM C1193 - Standard Guide for Use of Joint Sealants.

J. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.

K. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

L. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California Amendments.

M. GANA (GM) - GANA Glazing Manual.

N. GANA (SM) - GANA Sealant Manual.

O. GANA (LGRM) - Laminated Glazing Reference Manual.

P. UL 972 - Standard for Burglary Resisting Glazing Material.

1.04 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

F. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

G. Glazing Units Surfaces:

1. Insulated units:

a. Side 1 - Exterior surface of outer pane.

b. Side 2 - Interior surface of outer pane.

c. Side 3 - Interior surface of inner pane.

d. Side 4 - Exterior surface of inner pane

2. Laminated units:

a. Side 1 - Top surface of top outer pane in horizontal orientation.

b. Interlayer: PVB material between two pieces of monolithic glass

c. Side 2 - Underside of bottom outer pane in horizontal orientation.

1.05 SUBMITTALS

A. General: Submit in accordance with Section 01 3300.

B. Provide complete submittals at the same time as submittals for work in related sections to permit review of complete and integrated systems and assemblies.

C. Product Data on Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

D. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

E. Preconstruction Compatibility and Adhesion Test Report: Submit statement from sealant manufacturer indicating that glass and glazing materials have been tested for compatibility and adhesion with glazing sealants and interpreting test results relative to material performance, including recommendations for primers and substrate preparation needed to obtain adhesion.

F. CAL-GREEN Submittals:

1. Product Data - VOC Limits: For adhesives sealants, fillers and primers, documentation including printed statement of VOC contents, comply with limits specified in Section 01 6116.

G. Samples: Submit two samples 12 by 12 inch in size of glass units.

H. Samples: Submit 2 inch long bead of glazing sealant, color as selected.

I. Certificate: Certify that products of this section meet or exceed specified requirements.

J. Installer's Qualification Statement.

K. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

L. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Insulating Glass Units: One of each glass size and each glass type.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), IGMA TM-3000, and SIGMA TM-3000 for glazing installation methods. Maintain one copy on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five (5) years documented experience.

D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

E. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.

2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

F. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 .

1. Provide safety glazing products permanently marked with certification label of the Safety Glazing Certification Council (SGCC) <http://www.sgcc.org/> or another certification agency acceptable to authorities having jurisdiction.

2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites, provide glazing products that comply with Category II materials only.

G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.

2. Associated Laboratories, Inc.

H. Source Limitations for Glass: Provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

I. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

1.07 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

C. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Fabricators:

1. Any of the glass manufacturers named below.

2. Viracon, Inc: www.viracon.com/#sle.

3. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Float Glass Manufacturers:

1. Cardinal Glass Industries; _____: www.cardinalcorp.com/#sle.

2. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.

3. Substitutions: Refer to Section 01 6000 - Product Requirements.

2.02 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.

1. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.

2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.

3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.

4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.

1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.

2. Polyvinyl Butyral (PVB) Interlayer: 0.060 inch thick, minimum.

2.03 GLAZING UNITS

A. Monolithic Interior Vision Glazing:

1. Applications: Interior glazing unless otherwise indicated.

2. Glass Type: Fully tempered float glass.

3. Tint: Clear.

4. Thickness: 1/4 inch, nominal.

B. Monolithic Safety Glazing: Non-fire-rated.

1. Applications:

a. Glazed view windows and panels in partitions enclosing athletic activity rooms, except in fire-rated walls and partitions.

b. Other locations required by applicable federal, state, and local codes and regulations.

c. Other locations indicated on drawings.

2. Glass Type: Fully tempered safety glass as specified.

3. Tint: Clear.

4. Thickness: 1/4 inch, nominal.

2.04 GLAZING COMPOUNDS

A. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; black color.

2.05 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

1. Width: As required for application.

2. Thickness: As required for application.

3. Spacer Rod Diameter: As required for application.

4. Manufacturers:

a. Pecora Corporation; _____: www.pecora.com/#sle.

b. Substitutions: Refer to Section 01 6000 - Product Requirements.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

2.06 SOURCE QUALITY CONTROL

A. Provide shop inspection and testing for insulated glass.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Glass Product:

1. Verify that each piece of glass is free of scratches or marred surfaces.

2. Verify that all edges are clean cut and finished in the specified manner.

F. Obtain installers written report listing conditions detrimental to performance of glazing work. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.

1. Use a rolling block in rotating glass units to prevent damage to glass corners.

2. Do not impact glass with metal framing.

3. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar.

4. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening.

5. Discard glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

E. Provide spacers for glass lites where length plus width is larger than 50 -inches (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

F. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

G. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Install so that appropriate rating agency markings remain permanently visible.

J. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.

1. Place glazing tape on glazing pane of unit with tape flush with sight line.

G. Fill gap between glazing and stop with silicone type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

H. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.05 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

F. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.

G. Carefully trim protruding tape with knife.

3.06 TOLERANCES

A. Erection Tolerances: Install components plumb, level, accurately aligned, and located in reference to column lines and floor levels. Erection tolerances indicated below are the maximum allowable for both no-load and full-load conditions and are not cumulative. Adjust work to conform to the following tolerances:

1. Plumb: 1/8 -inch in 10 -feet; 1/4 -inch in 40 -feet.

2. Level: 1/8 -inch in 20 -feet; 1/4 -inch in 40 -feet.

3. Alignment: Limit offset of member alignment to 1/16 -inch where surfaces are flush or less than 1/2 -inch out of flush and separated by less than 3 -inches by protruding work; otherwise limit offsets to 1/8 inch.

3.07 FIELD QUALITY CONTROL

A. Glass and Glazing product manufacturers to provide field observation of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.08 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.09 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

C. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 8300
MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Custom-Built and Site-Fabricated Glass Mirror Systems: at Dance Room and Weight Room walls and at Locker Rooms

1. Tempered safety glass.

B. Polycarbonate mirrors.

1.02 RELATED SECTIONS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 10 2800 Toilet, Bath, and Laundry Accessories: Manufactured mirror units.

1.03 REFERENCE STANDARDS

A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

B. ASTM C1036 - Standard Specification for Flat Glass.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants.

E. GANA (GM) - GANA Glazing Manual.

F. GANA (SM) - GANA Sealant Manual.

G. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals for submittal procedures.

B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds: Submit chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. CAL-GREEN Submittals:

1. Product Data - VOC Limits: For adhesives sealants, fillers and primers, documentation including printed statement of VOC contents, comply with limits specified in Section 01 6116.

E. Samples: Submit two 12inch x 12 inch in size, illustrating mirrors, coloration, design.

1. Mirrored Glass: Including safety backing and edge treatment on 2 adjoining edges.

2. Mirror clips.

3. Mirror Trim: 12 inches (300 mm) long.

F. Preconstruction Test Report: For mirror mastic compatibility.

G. Manufacturer's Certificate: Certify that mirrors, meets or exceeds specified requirements.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Glazing Publications: Comply with published recommendations in GANA's "Glazing Manual," unless more stringent requirements are indicated.

C. NAAMM's Publication: For silvered mirrored glass, comply with recommendations in NAAMM's "Mirrors, Handle with Extreme Care, Tips for the Professional on the Care and Handling of Mirrors."

D. Preconstruction Compatibility Test: Submit mirror mastic products to organic protective coating manufacturer for testing to determine compatibility of adhesive with mirrored glass coating.

E. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.06 DELIVERY, STORAGE, AND HANDLING

A. For silvered mirrored glass, comply with mirrored glass manufacturer's written instructions for shipping, storing, and handling mirrored glass as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.07 FIELD CONDITIONS

A. Do not install mirrors when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

A. See Section 01 7000 - Contract Closeout for additional warranty submittal requirements.

B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Mirrors:

1. Guardian Industries: www.guardian.com

2. Binswanger Mirror/ACI Distribution: www.binswangerglass.com/#sle.

3. Lenoir Mirror Co: www.lenoirmirror.com/#sle.

4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. VOC Limits for all adhesives sealants, fillers, primers and coatings: Comply with limits specified in Section 01 6116.

B. Optical Distortion Limits (Roll Wave Distortion Limits):

1. Maximum peak-to-valley roll wave 0.003 inch (0.08 mm) in the central area of the glass lite, and 0.008 inch (0.20 mm) within 12 inches (305 mm) of the leading and trailing edge of the lite, measured in accordance with ASTM C 1651.

2. Maximum center-kink of 0.001 inch (0.025 mm) when roll wave is measured over the surface of the glass perpendicular to the direction of travel through the heat treatment furnace.

3. Maximum localized and overall bow (warp) per lite shall each be one-half of maximum allowed by ASTM C 1048.

4. Measure glass lites for optical distortion using Osprey® (version 7 or higher, by Lite Sentry) online distortion measurement system (or equivalent approved in writing by industrial coated glass supplier). Retain test reports for three years following substantial completion. Submit test reports upon Architect's request.

C. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.

D. Mirrors of annealed glass with safety backing membranes are acceptable per CBC 2406.1 Exception 1 at locations where the mirror is applied directly to and supported by the substrate with adhesive. Provide mirrors of tempered glass complying with Category Class II per CPSC 16 CFR Part 1201 otherwise.

E. Mirror Glass: Clear, tempered safety glass; ASTM C1048, with copper and silver coatings, and protective overcoating.

1. Thickness: 1/4 inch.

2. Size: As indicated on drawings.

F. Polycarbonate Plastic Mirror: Abrasive resistant; clear; mirrored coating; single layer. At boys' locker room locker pedestal ends

1. Size: As indicated on drawings.

2.03 GLAZING COMPOUNDS

A. Silicone Sealant: ASTM C920, Type S, Grade NS, Class 25, Uses M and A; single component; chemical or solvent curing; non-bleeding, non-staining, cured Shore A hardness of 15 to 25; Selected color.

2.04 ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness.

B. Edge Sealer: Coating compatible with glass coating and approved by mirrored glass manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Stainless Steel Top and Bottom Trim: J-channels with return that produces glazing channel to accommodate mirrored glass thickness indicated.

1. Bottom and Top Trim: J-channels formed with front leg and back leg not less than 5/16 and 7/8 inch (8 and 22 mm) in height, respectively.

2. Product:

a. C. R. Laurence Co., Inc.; CRL Stainless Steel "J" Channel, No. SS960.

D. Fasteners: Fabricated of same basic metal and alloy as fastened metal.

E. Mirror Adhesive: An adhesive setting compound, produced specifically for setting mirrored glass by spot application and not containing asbestos, silicone pre-polymer based, chemically compatible with mirror coating and wall substrate, meeting requirements of VOC limits specified in related section and recommended by mirror manufacturer in writing..

2.05 FABRICATION

A. Cutouts: Fabricate cutouts for notches and holes in mirrored glass without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrored glass.

B. Mirrored Glass Edge Treatment: Rounded polished.

1. Silvered Mirror Glass: Seal edges after edge treatment to prevent chemical or atmospheric penetration of glass coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for mirrored glazing are correctly sized and within tolerance.

B. Verify that surfaces of mirror frames or recesses are clean, free of obstructions, and ready for installation of mirrors.

C. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous mirror frames or recesses with substrate compatible primer or sealer. Prime surfaces scheduled to receive sealant.

3.03 INSTALLATION

A. Install mirrors in accordance with manufacturer's recommendations.

B. Set mirrors plumb and level, with tempered glass roll wave distortion running in the horizontal direction.

C. Set mirrors with edge clearance free of surrounding construction including wall base, countertops or backsplashes.

D. Mastic Spot Installation System:

1. Apply barrier coat to mirrored glass backing where approved in writing by manufacturers of mirrored glass and backing material.

2. Apply mastic in spots to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrored glass units and face of mounting surface.

3. After mastic is applied, align mirrored glass units and press into place while maintaining a minimum air space of 1/8 inch (3 mm) between back of mirrored glass and mounting surface.

E. For wall-mounted mirrored glass units, install permanent means of support at bottom and top edges with bottom support designed to withstand mirrored glass weight and top support designed to prevent mirrored glass from coming away from wall along top edges.

1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrored glass units.

2. For continuous bottom supports, provide setting blocks 1/8 inch (2 mm) thick by 4 inches (100 mm) long at quarter points. For channels or other continuous supports in which water could be trapped, provide, between setting blocks, two slotted weeps not less than 1/4 inch (3 mm) wide by 3/8 inch (4.5 mm) long.

3. Where indicated, install bottom and top trim. Fabricate trim in single lengths to fit and cover top and bottom edges of mirrored glass units.

3.04 CLEANING

A. Remove wet glazing materials from finish surfaces.

B. Remove labels after work is complete.

C. Protect mirrored glass from breakage and contaminating substances resulting from construction operations.

D. Do not permit edges of silvered mirrored glass to be exposed to standing water.

E. Maintain environmental conditions that will prevent silvered mirrored glass from being exposed to moisture from condensation or other sources for continuous periods of time.

F. Clean mirrors and adjacent surfaces.

END OF SECTION

SECTION 09 0511

CONCRETE FLOOR PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Mechanical cleaning of new concrete floor surfaces for application of finished flooring.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Division 03 Section - Cast-In-Place Concrete for concrete floor slabs.

D. Division 07 Section - Water Vapor Emission Control System.

E. Division 09 Sections for applied floor finishes.

1.03 REFERENCES

A. ASTM C1583 - Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method).

B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.

C. ASTM D4259 - Standard Practice for Abrading Concrete.

D. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

E. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code.

F. International Concrete Repair Institute (ICRI) Guideline No. 03732- Selecting and Specifying Concrete; Surface Preparation for Sealers, Coatings and Polymer Overlays.

1.04 ADMINSTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
   1. Review conditions affecting substrate preparation.
   2. Review procedures that will be used for substrate preparation.
   3. Require attendance by Water Vapor Emission Control and Finish Flooring installers to review preparation requirements of floor finish product and flooring adhesive manufacturers

1.05 SUBMITTALS

A. Product Data: For each type of mechanical cleaning equipment used on the project.

B. CAL-Green Submittals:
   1. Dust Control Plan: Written description of materials and procedures used to control and remove dust from working area, prevent contamination of HVAC systems.

C. Informational Submittals
   1. Qualification Data: For Installer performing surface preparation.
   2. Field quality-control reports.

a. Submit report of observations.
b. Certify installation is complete in accordance with acceptance criteria specified.
c. Indicate supplementary instructions provided for Project specific conditions.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained in the use of the equipment and techniques required to produce the specified results.

B. Mockups: Provide field mockups to set quality standards for surface preparation execution and for preconstruction testing.
1. Provide mockup of typical surface preparation, minimum 100 sq. ft. area. Coordinate required size with requirements for preconstruction testing.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work..

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify new concrete floors have cured minimum 28 days.

B. Examine substrates, with Installer (s) present, for compliance with requirements for surface contamination, damage, and other conditions affecting performance of the Work.

C. Examine substrate to determine repairs required to restore substrate surface to be within tolerances required for floor finishes specified in other sections, prior to completing Work of this section.

D. Examine substrate to verify surfaces prepared in accordance with this section will be suitable for application of finishes specified in other sections.

E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance with recommendations for methods and materials required to correct conditions before proceeding with work of this section.

F. Proceed with surface preparation only after unsatisfactory conditions have been corrected.
1. Proceeding with surface preparations indicates acceptance and of surfaces and conditions of substrate.

3.02 SURFACE PREPARATION EQUIPMENT

A. Mechanical Cleaning Equipment: Automatic, dry shot blast type, self contained capable of recycling blast materials and collecting surface abrasions.

3.03 SURFACE PREPARATION

A. Protection: Mask and protect walls, equipment from adjacent work and finishes during installation process.

B. Mechanically clean concrete substrate and create surface profile in existing concrete substrate in accordance with ASTM D 4259 as required to meet acceptance criteria specified.
1. Acceptable methods include shotblasting, scarifying or grinding. Grinding is only acceptable in locations unreachable by shotblast or scarification equipment.

C. Acceptance Criteria:
   1. Surface profile of ICRI CSP 3 minimum, and greater as required by coating manufacturer in related sections, all in accordance with ICRI Technical Bulletin No. 03732.
   2. Tensile Strength of Concrete Surface: 200 psi minimum according to ASTM C1583 Test Method.
   3. Free of laitance, oil, grease, flooring adhesive, paint, and other surface contaminants capable of affecting bond of specified floor coatings and finishes to concrete substrate.

D. If floor develops areas of surface roughness greater than ICRI CSP-4 during preparation, apply patching/leveling compound in those areas and re-abrade to produce specified profile.

E. Repair surface irregularities after cleaning.
   1. Fill bugholes, spalls, cracks, deteriorated joints and other surface damage exposed or created as a result of substrate cleaning operations flush with adjacent surfaces to provide sound substrate for specified floor finish.

F. Dry broom or vacuum clean concrete substrates immediately before application of specified floor finishes in accordance with ASTM D 4258 to remove loose materials on substrate surface.

G. When field quality control report indicates portions are unsatisfactory, repeat process until field quality control report indicates there are no unsatisfactory portions remaining.
   1. Areas of insufficient strength shall be ground to remove weak materials and abrasively prepared again using appropriately modified methods. Retest these areas for tensile strength until compliance is determined.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
   1. Visual inspection of completed substrate preparation to verify contamination is removed.
   2. Visual inspection of completed substrate preparation to verify surface profile matches ICRI profile required for specified coating or finish, using ICRI standard rubber mold for visual comparison.
   3. Test tensile strength of the concrete surface according to ASTM C1583 Test Method to verify tensile strength of 200 psi minimum.
   4. Prepare field quality control report. Clearly indicate the locations, extents, and conditions of areas where surface preparation does not conform to specified profile and cleanliness. Document observed conditions with digital photographs.
   5. Repeat inspections when additional surface preparation for unsatisfactory conditions indicated in the previous field quality control report is completed.

3.05 PROTECTION

A. Protect prepared concrete substrates from contamination. Reclean substrates that are contaminated by construction operations prior to installation of specified floor coatings or finishes.

END OF SECTION

SECTION 09 0512

CONCRETE FLOOR MOISTURE CONTENT AND PH TESTING

PART 1 GENERAL

1.01 SUMMARY

A. Concrete moisture content testing using relative humidity method.

B. Concrete pH testing.

1.02 RELATED REQUIREMENTS

A. Pertinent section of Division 07 specifying water vapor emission control coating.

B. Pertinent section of Division 09 specifying concrete floor preparation.

C. Division 09 flooring sections specifiying flooring and accessories requiring moisture and pH testing.

1.03 REFERENCES

A. ASTM F2170-09 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

B. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

C. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California Amendments.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

B. Scheduling: Schedule work to permit concrete moisture testing to be completed minimum one week and maximum 3 weeks before floor coverings are installed.

1.05 SUBMITTALS

A. Product Data:
   1. Submit data indicating model, manufacturer, and calibration record for relative humidity measuring equipment.
   2. Submit data for pH test material products.

B. Shop Drawings:
   1. Indicate test locations shown on building floor plan,

C. Informational Submittals:
   1. Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for concrete moisture acceptable limits. Report test results in chart form.
      a. Relative Humidity Test Method: Indicate test dates, time, depth of test well, in-situ temperature, relative humidity and pH levels.
      b. Submit record of ambient air temperature, ambient relative humidity, and floor slab surface temperature when test sites are prepared, start of test, and end of test.
      c. Indicate condition of building enclosure including position of operable windows and exterior doors when test sites are prepared, start of test, and end of test.
      d. Submit transcript of datalogger.

e. Indicate operational status of HVAC systems maintaining environmental condition of spaces where tests are conducted when test sites are prepared, start of test, and end of test.

1.06 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not perform concrete moisture testing until building is enclosed and HVAC system is operational.
2. Maintain building test areas at design operating conditions for minimum 48 hours before, during, and continuously after conducting testing.
3. When HVAC system is not operational at start of tests, maintain ambient conditions within test areas at 65 to 85 degrees F and 40 to 60 percent relative humidity for minimum 48 hours before, during, and continuously after conducting testing until building HVAC system is capable of maintaining design operating conditions.

PART 2 PRODUCTS

2.01 RELATIVE HUMIDITY TEST EQUIPMENT

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Vaisala www.vaisala.com.
2. Wagner Moisture Meters, Rapid RH, www.wagnermeters.com.
3. Substitutions: Section 01 6000.

B. Humidity and Temperature Probe and Meter: Comply with ASTM F2170.

2.02 PH TEST MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Micro Essential Laboratory www.microessentiallab.com.
2. Substitutions: Section 01 6000.

B. pH Test Paper: Capable of indicating minimum 7.0 to 13 pH range.

C. pH Color Gage: Furnish pH test paper manufacturer's visual color gage to identify measured pH.

D. Water: Distilled or de-ionized.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify new concrete floors have cured minimum 28 days.

3.02 PREPARATION

A. When a building HVAC system is not operational and maintaining test areas at design operational conditions, install recording hygrometer or data logger in each separate test area to record ambient temperature and relative humidity beginning 48 hours before start of tests until completion of tests within each area.

B. Identify three moisture test sites for first 1,000 sf and one moisture test site for each additional 1,000 sf of floor area receiving floor covering on each separate floor slab.
1. Uniformly distribute test site locations throughout each test area.

3.03 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform concrete moisture tests and inspections and prepare test reports.
   1. Test all concrete slabs (on grade and elevated) in accordance with ASTM F-2170, not more than 45 days prior to the installation of the finished flooring. Test all floors scheduled to receive adhered floor coverings, such as hardwood, wood athletic flooring, bamboo, carpet, resilient tile, resilient sheet goods, rubber, fluid-applied, cork tile, ceramic tile, cementititious and epoxy resin terrazzo, and porcelain tile.

B. Acceptance Criteria at HVAC Design Operating Conditions:
   1. Relative Humidity Test Result: 75 percent maximum relative humidity.
   2. pH Test Result: Within alkalinity range of 7.0 to 9.0.

C. Concrete Moisture Testing – General
   1. Conduct relative humidity test at each test site.
   2. Conduct one pH test at each test site.

D. Relative Humidity Testing:
   1. Perform tests in accordance with ASTM F2170.
   2. Conduct relative humidity testing at the following depths:
      a. Slabs-On-Grade: Measure temperature and relative humidity at 40 percent of slab thickness measured from top surface.
      b. Elevated Slabs: Measure temperature and relative humidity at 20 percent of slab thickness measured from top surface.
   3. Drill test hole at each test site to accommodate test sleeve.
      a. Hole Diameter: In accordance with test equipment manufacturer's instructions.
      b. Drilling Fluids: Not permitted.
   4. Vacuum dust and debris from test hole.
   5. Insert sleeve, to the full depth of test hole. Cap or plug sleeve to prevent test hole contamination.
   6. Permit the test site to acclimate for minimum 72 hours before measuring relative humidity.
   7. Remove sleeve plug and insert probe to bottom of test hole. Allow test probe to reach temperature equilibration with concrete slab.
   8. Measure and record temperature and relative humidity at the test site.
   9. Record and report results.

E. pH Testing:
   1. Place several drops of water onto the concrete surface to form a puddle approximately 1 inch in diameter.
   2. Allow the water to set for approximately 60 seconds
   3. After 60 seconds, dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading.
   4. Record and report results.

3.04 PROTECTION

A. Protect tested concrete substrates from contamination. Reclean substrates that are contaminated by construction operations prior to installation of specified water vapor emission control coating, floor coatings or finishes.

END OF SECTION

SECTION 09 0561
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:

PART 2 PRODUCTS

PART 3 EXECUTION

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum board furring systems.

B. Gypsum wallboard.

C. Joint treatment and accessories.

D. Textured finish system.

E. Trim and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 06 1000 - Rough Carpentry: Building framing and sheathing.

C. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

D. Division 09: Pertinent sections specifying finishes installed over gypsum board substrates.

E. Section 09 9123 - Interior Painting.

F. Pertinent sections specifying facility services items penetrating gypsum board.

1.03 REFERENCE STANDARDS

A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units.

B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units.

C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

D. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.

E. ASTM C 635, Standard Specifications for Metal Suspension Systems.

F. ASTM C 636, Recommended Practice for Installation of Metal Suspension Systems.

G. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.

H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.

J. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

K. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

L. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.

M. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.

N. ASTM C1325 - Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.

O. ASTM C1396/C1396M - Standard Specification for Gypsum Board.

P. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.

Q. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels.

R. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

S. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

T. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

U. ASTM E413 - Classification for Rating Sound Insulation.

V. CISCA Ceiling Systems Installation Handbook.

W. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code.

X. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, "CAL-Green".

Y. Division of the State Architect (DSA) Interpretation of Regulations: IR 25-3, Drywall Ceiling Suspension Conventional Construction One-Layer.

Z. GA-214 - Recommended Levels of Gypsum Board Finish; Gypsum Association

AA. GA-216 - Application and Finishing of Gypsum Board.

AB. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association.

AC. California Building Code,Title 24, Part 2, California Building Code, Chapter 8.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Provide complete submittals at the same time as submittals for work in related sections to permit review of complete and integrated systems and assemblies.

C. Product Data: For each type of product indicated, demonstrate compliance with specified attributes.

D. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

E. CAL-GREEN Submittals: Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

F. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches in size, illustrating finish color and texture.

1.05 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
   1. Maintain one copy of standards at project site.

B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as indicated on drawings.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. National Gypsum Company: www.nationalgypsum.com.
   2. PABCO Gypsum: www.pabcogypsum.com.
   3. USG Corporation: www.usg.com.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Glass mat faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
   3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
      a. Mold resistant board is required at all locations.
   4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   5. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
      c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
   6. Mold Resistant Paper Faced Products:
      a. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard.
      b. National Gypsum Company; Gold Bond XP Gypsum Board.
      c. Substitutions: See Section 01 6000 - Product Requirements.
   7. Glass Mat Faced Products:
      a. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C.
      b. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum Panel.
      c. Substitutions: See Section 01 6000 - Product Requirements.

C. Impact Resistant Wallboard:
   1. Application: High-traffic areas indicated.
   2. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.

3. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
4. Hard Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
6. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
7. Type: Fire resistance rated Type X, UL or WH listed.
8. Thickness: 5/8 inch.
9. Edges: Tapered.

D. Backing Board For Wet Areas:
1. Application: Surfaces behind tile in wet areas including tub and shower surrounds and shower ceilings.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
   a. Thickness: 1/2 inch.
   b. Products:
      1) Custom Building Products: www.custombuildingproducts.com/#sle.
      2) National Gypsum Company; PermaBase Cement Board: www.nationalgypsum.com/#sle.
      3) USG Corporation: www.usg.com/#sle.
4. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
   a. Fire Resistant Type: Type X core, thickness 5/8 inch.
   b. Products:
      1) Georgia-Pacific Gypsum; DensShield Tile Backer.
      2) Substitutions: See Section 01 6000 - Product Requirements.

E. Moisture-Resistant Gypsum Backing Board: ASTM C1396/C1396M; ends square cut. Fire-rated Type X where occurring in designated rated assemblies.
1. Thickness: 5/8 inch.
2. Edges: tapered.

2.03 Gypsum Wallboard ACCESSORIES

A. Acoustic Insulation: Acoustic fiberglass batt type specified in Section 07 2100. Thickness as shown on drawings or as specifically noted; Provide to fill framing cavity depth otherwise.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
1. Products:
   a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.
   b. Liquid Nails, a brand of PPG Architectural Coatings; AS-825 Acoustical Sound Sealant: www.liquidnails.com/#sle.
   c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stifirestop.com/#sle.
   d. Substitutions: See Section 01 6000 - Product Requirements.

C. Board Insulation in furring cavities: Rigid polyisocyanurate, type specified in Section 07 2100.

D. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated. Mechanically fastened.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

E. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
   1. Corner Beads: Low profile, for 90 degree outside corners.
      a. Products:
         1) CertainTeed Corporation; No-Coat Drywall Corner: www.certainteed.com/#sle.
         2) ClarkDietrich; Strait-Flex Big-Stick: www.clarkdietrich.com/#sle.
         3) Phillips Manufacturing Co; Everlast Corner Bead: www.phillipsmfg.com/#sle.
         4) Substitutions: See Section 01 6000 - Product Requirements.
   2. Corner Beads: Low profile, for archways.
      a. Products:
         1) ClarkDietrich; Strait-Flex Arch-Stick: www.clarkdietrich.com/#sle.
   3. Expansion Joints:
      a. Type: V-shaped metal with factory-installed protective tape.

F. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions. Water resistant where used with water resistant backer board.
   1. Tape: 2 inch wide, creased paper tape for joints and corners, USG "Perf-A-Tape", or equal.
   2. Joint Compound: Drying type, vinyl-based, ready-mixed.

G. Finishing Compound: Surface coat and primer, takes the place of skim coating.

H. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

I. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

J. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

K. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

L. Adhesives
   1. Modified contact adhesive: As recommended by the gypsum board manufacturer and having a placement time before setting of at least 15 minutes.
   2. Joint compound adhesive: As recommended by the gypsum board manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

B. Verify that framed substrates demonstrate flatness characteristics such that work of this section will meet specified tolerances.

3.02 INSTALLATION - GENERAL

A. Install materials in accordance with gypsum board application and finishing standards referenced.
   1. Single layer application: Screw attachment.
   2. Float interior angles, except where required to conform to fire or acoustical separation requirements.
   3. Do not install scored, scratched, broken, damp, or otherwise damaged boards.
   4. Smooth cut edges and ends to obtain neat fitting joints.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

F. Impact Resistant Gypsum Board: Install as for gypsum board. Do not install over faced insulation or other vapor-retarders.

G. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

H. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:
   1. Single-Layer Applications: Screw attachment.
   2. Double-Layer Applications: Install base layer using screws. Install face layer by screws.

I. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

J. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as directed.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C 840, and required by Section 09 9000 Painting and Coating, as follows:
   1. Level 5: Corridor walls to receive eggshell paint finish.
   2. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   3. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   4. Level 3: Walls to receive textured wall finish.
   5. Level 3: Ceilings to receive glued on acoustical ceiling tiles.
   6. Level 2: Behind cabinetry and on backing board to receive tile finish.
   7. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.07 TEXTURE FINISH

A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

B. Texture Required: .
   1. Finish Texture: Medium Orange Peel at walls and ceiling unless otherwise noted.
   2. No finish texture at Level 5 joint treatment walls and ceilings as noted.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board, Tack Board, or Cementitious Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 2400
CEMENT PLASTERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cement plastering.

1.02 RELATED REQUIREMENTS

A. Section 09 2116 - Gypsum Board Assemblies: furring for plaster.

B. Section 09 9123 - Interior Painting.

1.03 REFERENCE STANDARDS

A. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters.

B. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.05 FIELD CONDITIONS

A. Interior Plaster Work: Maintain minimum ambient temperature of 50 degrees F during installation of plaster and until fully cured.

PART 2 PRODUCTS

2.01 CEMENT PLASTER APPLICATIONS

A. Solid Plaster Base: existing Concrete masonry

1. Plaster Type: Jobsite mixed plaster.

2. Number of Coats: Three or as required to match existing adjacent plaster

2.02 JOBSITE MIXED CEMENT PLASTER

A. Materials:

1. Sand: Clean, well graded, and complying with ASTM C897.

2. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely affect plaster.

B. Plaster Mixes: Proportioned in accordance with ASTM C926; parts by volume.

1. First Coat Over Lath:

a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.

2. First Coat Over High Absorption Solid Base:

    a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.

3. Dash Bond Coat: One part Portland cement, with maximum 2 parts sand.

4. First Coat Over Low Absorption Solid Base:

    a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.

5. Second Coat: Same mixture as first coat, without fiber reinforcement, except minimum 3 parts and maximum 5 parts sand.

6. Finish Coat:

    a. Minimum 1-1/2 parts and maximum 3 parts sand, per total volume of cementitious materials.

2.03 ACCESSORIES

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify concrete surfaces are flat, honeycombs are filled flush, and surfaces are ready to receive work of this section, and that there are no existing bituminous, water repellent, or form release agent coatings on concrete surfaces that may be detrimental to plaster bond.

C. Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

3.02 PREPARATION

A. Dampen masonry surfaces to reduce excessive suction.

B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.

C. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.

D. Apply dash bond coat of plaster to solid bases and moist cure for at least 24 hours before applying first coat of jobsite mixed plaster.

3.03 Mixing

A. Mix only as much plaster as can be used prior to initial set.

B. Mix materials dry, to uniform color and consistency, before adding water.

C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.04 APPLICATION

A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.

B. Base Coats:

1. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.

C. Leveling Coat:

1. Apply leveling coat to specified thickness.

D. Finish Coats:

1. Cement Plaster:

a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.

b. Apply desired surface texture while mix is still workable.

c. Smooth trowel to a consistent finish.

3.05 TOLERANCES

A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.06 REPAIR

A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION

SECTION 09 3000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile: Ceramic and ceramic mosaic tile for floor, wall, and interior applications.

B. Shower or tub surrounds and waterproof membranes for walls and floors, interior application.

C. Cementitious backer board as tile substrate.

D. Coated glass mat backer board as tile substrate.

E. Stone thresholds.

F. Ceramic accessories.

G. Ceramic trim.

H. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 03 5400 - Cast Underlayment.

D. Pertinent sections specifying framed substrates.

E. Section 07 9200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

F. Section 08 3100 - Access Doors and Panels.

G. Section 09 2400 - Portland Cement Plastering: Lath and portland cement scratch coat and membrane, where required by TCNA Method specified.

H. Pertinent Sections specifying work penetrating tile surfaces.

1.03 REFERENCE STANDARDS

A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).

B. Manufacturer's specifications and recommendations for mounting in exterior or wet areas.

C. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.

D. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

E. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green".

F. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

G. Division of the State Architect Interpretation of Regulations (IR) 23-3: Approved Alternate for Toilet Room Curb, latest edition.

H. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

1.04 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

1. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

B. Module Size: Actual tile size plus joint width indicated.

C. Face Size: Actual tile size, excluding spacer lugs.

D. Large Format Tile: Tile that is greater than 15 inches (381 mm) in width or length.

E. Wet Area: Includes tile surfaces that are either soaked, saturated, or regularly and frequently subjected to moisture such as tub enclosures, showers, swimming pools, commercial kitchens and exterior areas.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

A. See Section 01 3300 - Submittal Procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, grout sealer and accessories. Include instructions for using grouts and adhesives.

1. Identify additional requirements and areas where manufacturer's installation instructions differ from TCNA documents.

C. CAL-GREEN Submittals:

1. Product Data – VOC Limits: For adhesives, sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

2. Product Data - Low/No-VOC Paints, Coatings and Tile Sealers. Provide certification that all primers and coatings meet VOC emission limits specified in in related section. List manufacturer, brand, application, type (flat or non-flat), number of gallon, and the VOC emissions in grams/liter. Include MSDS and product data sheet indicating VOC limits for each product provided.

D. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

E. Samples for Selection:

1. Two manufacturer color charts consisting of actual tiles or sections of tile showing full range of standard and custom colors, textures and patterns available for each type of tile indicated.

2. Grout and accessories requiring color selection.

F. Installation Instructions: Manufacturer's printed instructions for each product.

G. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

H. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.

I. Installer's Qualification Statement:

1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation.

2. Submit documentation of completion of apprenticeship and certification programs.

J. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Tile: 1 percent of each size, color, and surface finish combination, but not less than 10 square feet of each type.

3. Leftover Materials: all leftover materials not installed.

L. *Sustainability Submittals:*

1. *CAL-GREEN*

a. *Product Data – VOC Limits: For adhesives, sealants, fillers, primers, and coatings installed on site, submit documentation including printed statement of VOC limits. Comply with limits specified in 01 6116 VOC RESTRICTIONS. Provide completed and signed 01 6116.1 ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM for any materials installed on site but not explicitly specified.*

b. *Product Data – Low-Emitting Tile Setting Materials and Grouts: Provide certification that each setting material and grouts has undergone general emissions testing and evaluation according to the CDPH v1.2-2017 Standard Method for the school classroom parameters*

when modeled as Flooring. Measured Concentration of TVOCs shall be less than 5.0 mg/m^3.

c. *Product Data – Global Warming Potential (GWP): Provide product-specific Environmental Product Declaration (EPD) complying with 01 8113 SUSTAINABLE DESIGN REQUIREMENTS. Limits are as specified for each material.*

2. *Additional Sustainability Information*

a. *Comply with the submittal requirements of 01 8113 SUSTAINABLE DESIGN REQUIREMENTS.*

b. *Product Data - Recycled content*

1) *Post-consumer and pre-consumer/post-industrial percentages reported as separate figures*

2) *Reported on manufacturer-generated document with logo/letterhead OR by third-party verified certificate*

c. *Product Data – Global Warming Potential (GWP): Provide product-specific Environmental Product Declaration (EPD) complying with 01 8113 SUSTAINABLE DESIGN REQUIREMENTS. Limits are as specified for each material.*

1.07 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

C. Installer Qualifications:

1. Company specializing in performing tile installation, with minimum of five years of documented experience.

a. Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Trowel of Excellence member of the Tile Contractors' Association of America (TCAA).

2. Installer Certification:

a. Ceramic Tile Education Foundation (CTEF): Certified Tile Installer (CTI).

b. Apprenticeship Program: Installer has achieved Journeyworker status through an apprenticeship from the International Union of Bricklayers and Allied Craftworkers (IUBAC) or a U.S. Department of Labor (DOL)-recognized program.

1.08 MOCK-UP

A. See Section 01 4000 - Quality Control, for general requirements for mock-up.

B. Construct tile mock-up in a mutually accepted location, incorporating all components specified for the location. Minimum size 8 feet long by full height of indicated tile extent.

C. Approved mock-up may remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

1. Provide heated and dry storage facilities on site.

B. Package labeling in accordance with ANSI A137.1. Retain labels and packaging until disposal is authorized by Architect.

C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions. Do not use frozen materials.

D. Deliver and store materials on site at least 24 hours before work begins.

1.10 FIELD CONDITIONS

A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

PART 2 PRODUCTS

2.01 DESIGN REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Slip Resistance: For tile installed on walking surfaces, stair treads and landings, provide products with the following values as determined by testing identical products per ANSI A137.1-2012, Section 9.6

1. Method: Dynamic Coefficient of Friction DCOF AcuTest method, wet test using 0.05 percent sodium lauryl sulfate solution.

2. Application: Level interior flooring surface

3. Tested value: 0.42 or greater

C. Expansion Joints: In accordance with EJ-171 of the Tile Installation Handbook. Provide at expansion joints in the backing materials, cold joints in concrete substrate or where backing materials change.

1. Exterior Work and Interior Wet Locations: Provide on all surfaces maximum 12-feet on center in both axes.

2. Interior Work, not otherwise specified: Provide on continuous floor areas at intervals of 24-feet.

D. Wainscots: Make top course full uncut tile. Extend wainscot to higher elevation by adding horizontal courses of tile as required to completely surround access panels, switch or outlet covers with finished tile. Do not permit these items penetrating tile surfaces to split the boundary of the tile surface.

2.02 TILE

A. General:

1. Field and accent tiles shall be of the same caliper.

2. Each room with tile in each building shall have a separate color scheme.

3. Field colors to be selected from price group 2, accent colors to be selected from premium price groups. Allow for one accent color to be selected from price groups 3 or 4, minimum per tile type at each separate location unless noted otherwise below.

B. *Ceramic Tile*

1. *Manufacturers: All products by same manufacturer. Manufacturers are listed from most sustainable option to least.*

a. *Mosa*

b. *Daltile: basis of design:*

1) *Mosaic Tile: Keystone collection, unglased, square edge, shape and size as selected*

2) *Glazed Wall Tile: Color Wheel Mosaic Collection, high gloss, shape and size as selected.*

c. *Interceramic*

d. *American Olean*

2. *Sustainability Attributes*

a. *Recycled content of tile: min 6%*

b. *Embodied carbon footprint of tile: GWP not to exceed North American industry average of 14.1 kg CO2 eq per square meter for scopes A1-A3 (cradle-to-gate). Reference EPD: industry-wide Tile Council of North America EPD "Ceramic Tile" issued April 1, 2020.*

C. *Porcelain Tile*

1. *Manufacturers: All products by same manufacturer. Manufacturers are listed from most sustainable option to least.*

a. *Mosa*

b. *Crossville*

2. *Sustainability Attributes*

a. *Recycled content of tile: min 6%*

b. *Embodied carbon footprint of tile: GWP not to exceed 14.1 kg CO2 eq per square meter for scopes A1-A3 (cradle-to-gate). Reference EPD: industry-wide Tile Council of North America EPD "Ceramic Tile" issued April 1, 2020.*

2.03 TRIM AND ACCESSORIES

A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.

B. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.

1. Applications:

a. Open Edges: Bullnose.

b. Inside Corners: Coved.

c. Floor to Wall Joints: Cove base.

2. Manufacturers: Same as for tile.

C. Non-Ceramic Trim: Satin brass anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.

1. Applications:

a. Open edges of wall tile.

b. Wall corners, outside and inside.

c. Borders and other trim as indicated on drawings.

d. Balcony and terrace edge trim and fascia.

2. Manufacturers: *Manufacturers are listed alphabetically.*

a. Genesis APS International: www.genesis-aps.com/#sle.

b. Schluter-Systems: www.schluter.com/#sle.

c. Substitutions: See Section 01 6000 - Product Requirements. Comparison of sustainability attributes to basis of design.

3. Sustainability Attributes

a. *Recycled content of steel trim: no minimum*

b. *Recycled content of aluminum trim: no minimum*

c. *Embodied carbon footprint of steel trim: no limit*

d. *Embodied carbon footprint of aluminum trim: no limit*

D. Thresholds: Marble, white or gray, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.

1. Applications:

    a. At doorways where tile terminates.

    b. At open edges of floor tile where adjacent finish is a different height.

2.04 SETTING MATERIALS (NOTE TO ARCHITECT: Manufacturers are listed in order from most sustainable option to least.)

A. Acceptable Manufacturers:

1. Mapei Corporation; www.mapei.com.

2. LATICRETE International, Inc; www.laticrete.com.

3. Custom Building Products; www.custombuildingproducts.com (CANNO

4. Substitutions: See Section 01 6000 - Product Requirements.

B. Sustainability Attributes

1. *Embodied carbon footprint of cement mortars: GWP not to exceed 2.18 kg CO2 eq per 4.07 kg for scopes A1-A3 (cradle-to-gate). Reference EPD: industry-wide Tile Council of North America EPD "Cement Mortar" issued January 1, 2023.*

2. *Embodied carbon footprint of mastics: no limit*

C. Source Limitations: Provide tile grout, setting materials, additives, and factory-prepared dry-set mortars and surface preparation materials, waterproofing and crack isolation membranes, and self-leveling underlayments from the same manufacturer.

D. Latex-Portland Cement Mortar Bond Coat:

1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.

2. Products:

    a. Mapei; www.mapei.com.

        1) Kerabond Thin-set Mortar gauged with Keralastic Latex Additive

        2) UltraFlex3 gauged with water only.

        3) Ultra Lite fortified thin-set mortar gauged with water only.

    b. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com/#sle.

    c. Custom Building Products; www.custombuildingproducts.com.

        1) Premium Plus Thin Set Mortar gauged with Thin-Set Mortar Additive.

        2) ProLite Lightweight Fortified Thin-Set Mortar, gauged with water only.

3) MegaFlex Fortified ThinSet Mortar, gauged with water only.

d. Substitutions: See Section 01 6000 - Product Requirements.

E. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.

1. Applications: Where indicated on drawings and as required by TCNA methods specified.

2. Products:

a. Custom Building Products; EBMLite - Lightweight Epoxy Bonding Mortar or CEGLite - Lightweight Commercial Epoxy Grout - Setting and Grouting Epoxy www.custombuildingproducts.com.

b. LATICRETE International, Inc; LATICRETE LATAPOXY 300 Adhesive: www.laticrete.com/#sle.

c. Substitutions: See Section 01 6000 - Product Requirements.

F. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.

1. Products:

a. Custom Building Products; Thick Bed Bedding Mortar: www.custombuildingproducts.com.

b. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: www.laticrete.com/#sle.

c. Mapei; 4 To 1 Mud Bed Mix: www.mapei.com.

d. Substitutions: See Section 01 6000 - Product Requirements.

2.05 GROUTS (NOTE TO ARCHITECT: Manufacturers are listed in order from most sustainable option to least.)

A. Manufacturers:

1. Mapei Corporation[<>]: www.mapei.com.

2. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.

3. Custom Building Products: www.custombuildingproducts.com

4. Substitutions: See Section 01 6000 - Product Requirements.

B. *Sustainability Attributes*

1. *Embodied carbon footprint of cement grouts: GWP not to exceed 0.153 kg CO2 eq per 0.212 kg for scopes A1-A3 (cradle-to-gate). Reference EPD: industry-wide Tile Council of North America EPD "Cement Grout for Tile Installation" issued January 1, 2023.*

C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout with a VOC content of 65 g/L or less and a System Warranty of Twenty-Five Years.

1. Applications: Where indicated.

2. Color(s): As selected by Architect from manufacturer's full line.

3. Products:

   a. Custom Building Products; CEGLite Lightweight Commercial Epoxy Grout.

   b. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com/#sle.

   c. Mapei; Kerapoxy.

2.06 MAINTENANCE MATERIALS (NOTE TO ARCHITECT: Manufacturers are listed in order from most sustainable option to least.)

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.

1. Applications: Between tile and plumbing fixtures.

2. Color(s): As selected by Architect from manufacturer's full line.

3. Products:

   a. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.

   b. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.

   c. Mapei Corporation[<>]: www.mapei.com.

   d. Miracle Sealants., www.rustoleum.com

   e. Substitutions: See Section 01 6000 - Product Requirements.

B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout that does not change color or appearance of grout. Colorless, no-sheen, water-based penetrating slip and stain-resistant sealer, not affecting color or physical properties of surfaces as recommended by tile manufacturers..

1. Composition: Water-based colorless silicone.

2. Products:

   a. Aqua Mix® Sealers Choice® Gold as manufactured by CUSTOM Building Products, www.custombuildingproducts.com www.custombuildingproducts.com.

   b. DuPont™ StoneTech® Professional Impregnator Pro® Sealer as manufactured by Dupont, www2.dupont.com as supplied by Laticrete, www.laticrete.com.

   c. MAPEI Corporation, www.mapei.com, Ultracare™ line of products.

   d. Miracle, www.miraclesealants.com, Impregnator 511 (Original).

e. Substitutions: See Section 01 6000 - Product Requirements.

2.07 ACCESSORY MATERIALS

A. Waterproofing Membrane at Floors and Shower Pans: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10. By same manufacturer as type specified for walls, to provide continuous warranty.

1. Bonded Sheet Membrane Type:

a. Material: Polyethylene and polypropylene sheet membrane with non-woven fabric laminated to both sides, 20 to 30 mils thick, nominal.

b. Products:

1) LATICRETE International, Inc; LATICRETE HYDRO BAN Sheet Membrane: www.laticrete.com/#sle.

2) Substitutions: See Section 01 6000 - Product Requirements.

B. Waterproofing Membrane at Showers and Tiled Tubs: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10. Same manufacturer as sheet membrane type specified for shower pans and floors to provide continous warranty.

1. Fluid or Trowel Applied Type:

a. Material: Synthetic rubber.

b. Thickness: 25 mils, minimum, dry film thickness.

c. Products:

1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.

2) Substitutions: See Section 01 6000 - Product Requirements.

C. Cleavage Membrane Under Thick Mortar Bed:

1. Material: No. 15 asphalt saturated felt.

D. Reinforcing Mesh: 2 by 2 inch size weave of 16/16 wire size; welded fabric, galvanized.

E. Membrane at Walls:

1. Material: 4 mil thick polyethylene film.

F. Underlayment at Floors: Specifically designed for bonding to thin-set setting mortar; not primarily a waterproofing material and having the following characteristics:

1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.

2. Uncoupling Function: Allow for separation between membrane and the mortar adhering tile to the membrane when subjected to excessive substrate movement.

3. Suitable for installation over green concrete.

4. Suitable for installation over wood-based substrates.

5. Type: Fluid or Trowel Applied.

a. Products:

1) Custom Building Products; Redgard Crack Prevention and Waterproofing Membrane: www.custombuildingproducts.com.

2) LATICRETE International, Inc; LATICRETE 125 Sound and Crack Adhesive: www.laticrete.com/#sle.

3) Substitutions: See Section 01 6000 - Product Requirements.

G. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.

H. Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.

I. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

J. Cleaning solutions

1. Glazed tile: Acid or pH-neutral solutions as approved by the grout and tile manufacturers.

2. Unglazed Tile: Clean with pH-neutral solutions.

K. Tile Polish: As recommend by tile and grout manufacturers.

2.08 MIXES

A. Proportion and mix materials in accordance with manufacturer's instructions and applicable ANSI standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine, with installer present, surfaces to receive tile work and conditions under which tile will be installed. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standards and manufacturer's printed instructions. Prepared substrates to be in accordance with ANSI A108, A3.1 and Tile Council of North America (TCNA) recommendations.

B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

D. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances. Shim wood framingsubstrates to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

E. Blend tile before installation and ensure that variations are uniform in each location.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCNA Handbook recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

1. Align joints when adjoining tile on floor, base, walls and trim are same size.

2. Layout tile work and center tile fields in both directions in each space or on each wall area.

3. Provide minimum 1/2 tile at field edges.

4. Adjust to minimize tile cutting. Provide uniform joint widths.

C. Place thresholds at exposed tile edges.

D. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

F. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

G. Form internal angles square and external angles bullnosed.

H. Accurately form intersections and returns.

1. Perform cutting and drilling of tile without marring visible surfaces.

2. Carefully grind cut edges of tile abutting trim, finish or built-in items to produce straight aligned joints.

3. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.

4. Terminate tile at center line of doors, unless otherwise indicated.

5. Ensure that joints are symmetrical and that tile surfaces are plumb, true to line, and parallel to the room axis

I. Install ceramic accessories rigidly in prepared openings.

J. Install non-ceramic trim in accordance with manufacturer's instructions.

K. Install thresholds where indicated.

L. Sound tile after setting. Replace hollow sounding units.

M. Install expansion and control joints in accordance with TCNA method EJ171.

N. Keep control and expansion joints free of mortar, grout, and adhesive.

O. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 1/8 inch per foot nominal without retention of water or ponding.

P. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

Q. Grout tile joints. Conform to requirements of ANSI A108.10.Use standard grout unless otherwise indicated.

R. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

S. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

1. Seal joint between wainscots and fixtures; seal around pipes penetrating wainscots. Tool exposed sealant joints to a uniformly smooth surface without laps, sags or depressions.

T. Grout Sealing: Test sealer before application and assure that sealer will not stain grout.

1. Test sealer before application and assure that sealer will not stain grout.

2. Seal joints between wainscots and fixtures, seal around pipes pentrating wainscots.

3. Tool exposed sealant joints to uniform smooth surface without laps, sags or depressions.

U. Cracked, split, chipped, misaligned or broken tiles will not be accepted in finished work.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

B. Quarry Tile over interior concrete substrates, install in accordance with TCNA Handbook Method F115, with epoxy grout.

C. Ceramic Mosaic Tile over interior underlayments with waterproof membrane: install in accordance with TCNA Handbook Method F122A with epoxy grout.

D. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.05 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over interior concrete substrates, install in accordance with TCNA Handbook Method F112, bonded , unless otherwise indicated.

1. Where waterproofing membrane is indicated, with standard grout or no mention of grout type, install in accordance with TCNA Handbook Method F121.

2. Where epoxy bond coat and grout are indicated, install in accordance with TCNA Handbook Method F132, bonded.

B. Cleavage Membrane: Seal joints and penetrations, Lap edges and ends.

C. Mortar Bed Thickness: 5/8 inch, unless otherwise indicated.

3.06 INSTALLATION - SHOWERS AND BATHTUB WALLS

A. At tiled shower receptors install in accordance with TCNA Handbook Method B415, mortar bed floor, and W244, thin-set over cementitious backer unit walls.

B. Grout with silicone rubber grout.

3.07 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCNA Handbook Method W244C, using membrane at toilet rooms.

B. Over coated glass mat backer board on studs, install in accordance with TCNA Handbook Method W245, using membrane at toilet rooms.

C. Over interior concrete and masonry install in accordance with TCNA (HB) Method W211, bonded mortar bed without membrane.

3.08 GROUTING

A. Grout joints in accordance with manufacturer's instructions and ANSI A108.10.

B. Clean sanding water, dust, and foreign substances from joints to be grouted.

C. Clean and dry tile surfaces.

D. After grouting, remove all grout residue promptly.

3.09 TOLERANCES

A. Variation from Plumb: For vertical joints, external corners, and other conspicuous lines, do not exceed 1/8 inch in 10 feet.

B. Variation in Level: For horizontal joints and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 -inch (12 mm) maximum.

C. Maximum Variation of Surface Flatness For Tile Floors: 1/8 inch in ten feet, non-cumulative, free of ponding, all water flows to drains.

D. Maximum Variation of Surface Flatness For Tile Walls: 1/8 inch in ten feet, non-cumulative.

E. Variation in Plane between Adjacent Units (Lipping): Do not exceed the following differences between faces of adjacent units as measured from a straightedge parallel to stone tiled surface:

1. Units with Polished Faces: 1/64 -inch (0.4 mm).

2. Units with Honed Faces: 1/32 -inch (0.8 mm).

3. Units with Sand-Rubbed Faces: 1/32 -inch (0.8 mm).

4. Units with Thermal-Finished Faces: Depth of thermal finish or 3/16 -inch (5 mm), whichever is less.

5. Units with Natural-Cleft Faces: Depth of natural-cleft finish or 3/16 -inch (5 mm), whichever is less.

F. Variation in Joint Width: Do not vary joint thickness more than 1/16 -inch (1.6 mm) or one-fourth of nominal joint width, whichever is less.

G. Correct surfaces if tolerances are not as specified.

H. Correct defects by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas for compliance.

3.10 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Allow grout to cure 14 days before cleaning. Clean all ceramic tile surfaces so they are free of foreign matter. Flush surface with clean water before and after cleaning.

C. Clean tile and grout surfaces.

D. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning.

E. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.11 PROTECTION

A. Do not permit traffic over finished floor surface for 7 days after installation.

B. Floors: Protect from all traffic for at least 72 hours after installation.

1. Do not step on floor for at least 24 hours; if traffic is unavoidable after that, use plywood stepping boards.

2. Protect from heavy traffic for at least 7 days after installation.

3. When fast-setting materials are used to allow faster occupancy, comply with the manufacturer's recommendations.

4. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage and wear.

C. Walls: Protect from impact, vibration and heavy hammering on adjacent and opposite walls for at least 14 days after installation, unless manufacturer's instructions allow a shorter period.

D. Protect from food products and chemicals which can cause staining for at least 14 days.

E. Protect from freezing and total water immersion for at least 21 days after installation.

END OF SECTION

SECTION 09 5153
DIRECT-APPLIED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustic units.

B. Perimeter trim.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

1.03 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

B. ASTM E795 - Standard Practices for Mounting Test Specimens during Sound Absorption Tests.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

E. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

F. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustic units after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Provide data on acoustic units and accessories.

C. CAL-GREEN Submittals: Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

D. Shop Drawings: Indicate tile layout and related junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to systemand other ceiling-related work.

E. Samples: Submit two samples, of manufacturer's standard size, illustrating material and finish of acoustic units.

F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and _____.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Acoustical Units: Quantity equal to 5 percent of total installed

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum five (5) years of documented experience.

1.07 PROJECT CONDITIONS

A. Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustic units after interior wet work is dry.

C. Maintain uniform temperature and humidity not exceeding the manufacturer's outside limits prior to, during, and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Direct Applied Acoustical Ceilings:

1. Armstrong World Industries, Inc: www.armstrong.com/#sle.

2. USG: www.usg.com/#sle.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Acoustic Tile, Direct Applied: Mineral Fiber, wet-formed, factory-applied scrim, ASTM E1264, Type IV, Form 2, Pattern E.

1. Size: 12 by 12 inches.

2. Thickness: 3/4 inch minimum.

3. Noise Reduction Coefficient (NRC): 0.75 when tested in accordance with ASTM C423 for Type direct-applied mounting, per ASTM E795.

4. Fire Hazard Classification: ASTM E84 Class A (Flame Spread 25 or under), UL Labeled.

5. Surface Burning Characteristics: Flame spread index of 0-25, smoke developed index of 0-50, when tested in accordance with ASTM E84.

6. Humidity/Sag Resistance: HumiGuard® Plus.

7. Anti-Mold/Mildew: BioBlock® performance resist the growth of mold and mildew on the tile surface. Disinfectable CleanAssure™.

8. VOC Emissions: GreenGuard Gold Certified with California Dept. of Public Health CDPH/EHLB Standard Method.

9. Recycled Content: Exceed 50% total recycled content.

10. Edge: Square.

11. Surface Color: As selected by Architect. Provide Theater Black at Darkroom locations and colors as selected at other locations, minimum of two colors required.

12. Surface Pattern/Finish: Smooth.

13. Product:

    a. Armstrong; INVISACOUSTICS™; www.armstrongceilings.com.

    b. Certainteed, ECOPHON® FOCUS™ B, F, SQ; www.certainteed.com/ceilings.

    c. Substitutions: Section 01 6000.

C. Adhesive: Waterproof, gun grade; type recommended by tile manufacturer.

D. Perimeter Moldings: Rolled steel profile, white color.

E. Acoustic Sealant for Perimeter Moldings: Acrylic emulsion latex or water-based elastomeric sealant of type recommended by tile manufacturer and meeting requirements of Section 07 9200; do not use solvent-based non-curing butyl sealant.

2.03 FINISHES

A. Acoustic Tile and Perimeter Trim Color(s) as selected by Architect from:

1. Manufacturer’s full range of standard colors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions and substrate flatness before starting work.

B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION

A. Install system in accordance with manufacturer's instructions.

B. Perimeter Molding:

1. Install concealed edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant.

2. Use longest practical lengths.

3. Miter corners.

4. Provide concealed molding at junctions with other interruptions.

C. Center tile on room axis leaving equal border units.

D. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.

E. Install acoustic units level in uniform plane.

3.03 TOLERANCES

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

END OF SECTION

OMIT

SEC 6466
WOOD ATHLETIC FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood athletic flooring for the following

1. Weight Room

2. Dance Room

B. Subflooring.

C. Resilient cushioning.

D. Sheet vapor retarder.

E. Floor finishes.

F. Surface finishing.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 03 3000 - Cast-in-Place Concrete: Concrete subfloor surface.

C. 08 7100 Door Hardware: Thresholds

D. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

1.03 REFERENCE STANDARDS

A. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

B. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

C. ASTM F2772 - Standard Specification for Athletic Performance Properties of Indoor Sports Floor Systems.

D. DIN EN 14904 - Surfaces for Sports Areas – Indoor Surfaces for Multi-Sports Use – Specification.

E. MFMA (SPEC) - Guide Specifications for Maple Flooring Systems.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers; review preparation and installation procedures and

coordination and scheduling necessary for related work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for flooring, floor finish materials, and resilient cushion.

C. Samples: Submit two samples 12 by ___ inch in size showing floor finish, color, and sheen.

D. Test Reports: Submit test reports showing compliance with DIN EN 14904.

E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

F. Manufacturer's Instructions: Indicate standard and special installation procedures.

G. Sustainable Design Submittals: Submit VOC content documentation for field-applied adhesives, stains, finish coatings, and sealers.

H. Maintenance Data: Include maintenance procedures and recommended maintenance materials.

I. Manufacturer's qualification statement.

J. Installer's qualification statement.

1.06 QUALITY ASSURANCE

A. Perform work of this section in accordance with MFMA (SPEC).

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.

1. Minimum three years of documented experience.

C. Installer Qualifications: Company specializing in installing products specified in this section.

1. Minimum three years of documented experience.

1.07 MOCK-UPS

A. Locate where directed.

B. Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and store off the floor in a well-ventilated, weather-tight space.

1.09 FIELD CONDITIONS

A. Do not install wood flooring until wet construction work is complete and permanent heat and air conditioning is installed and operating.

B. Maintain room temperature between 55 degrees F and 75 degrees F and relative humidity between 35 to 50 percent for a period of seven days prior to delivery of materials to installation space, during

installation, and after installation.

C. Acclimate wood flooring materials to installation space a minimum of 48 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Athletic Flooring:

1. Connor Sports Flooring; _____: www.connorfloor.com/#sle.

2. Basis of Design: Robbins Sports Surfaces; LE LENA A WOOD FLOOR SYSTEM: www.robbinsfloor.com/#sle.

3. Substitutions: See Section 01 6000 - Product Requirements

2.02 Wood Athletic Flooring

A. General: Wood athletic flooring, system components provided by single manufacturer.

B. Application: _____.

1. Dance Room

2. Weight Room

C. System Description:

1. Fixed, cushioned sleeper with subfloor system, wood strip flooring.

2.03 Components

A. Wood Strip Flooring:

1. Species: Northern hard maple, kiln dried; tongue and groove edges, end matched, FSC certified

2. Grade: First.

3. Thickness: 25/32 inch.

4. Width: 1-1/2 inches.

B. Subflooring: Two layers of 15/32 inch thick plywood, APA rated, exposure 1, minimum span rating of 32/16.

C. Resilient Cushioning and Noise Attenuation: materials and thickness as required by Manufacturer_____ _____to meet specified use of product

D. Vapor Retarder: Polyethylene sheet, 6 mil thick; 2 inch wide tape for sealing sheet seams.

E. Fasteners and Anchors: Manufacturer's standard type and size to suit application.

2.04 Finishes

A. Floor Finishes: Types recommended by flooring manufacturer and complying with MFMA specifications.

1. Sealer: _____.as recommended by Manufacturer for specific application

2. Finish Coats: _____; _____.as recommended by Manufacturer for specific application

2.05 ACCESSORIES

A. Ventilating Base: Molded rubber, 4 inch high with a 4 inch toe, pre-molded outside corners; color as selected by Architect.

B. Thresholds: extruded aluminum, grooved, style and profile as detailed and to suit conditions. Type specified in Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting this work.

B. Verify that concrete subfloor surface is smooth and flat to plus or minus 1/8 ____ inch in 10 feet.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).

1. Test as Follows:

a. Internal Relative Humidity: ASTM F2170.

2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare substrate to receive wood flooring in accordance with manufacturer's and MFMA instructions.

B. Vacuum clean substrate.

3.03 INSTALLATION

A. Place vapor retarder over concrete surface, overlap seams a minimum of 6 inches and seal with tape.

B. Resilient Underlayment: Install in accordance with manufacturer's instructions.

C. Double Layer Plywood Subfloor:

D. Install solid blocking at doorways, in accordance with flooring manufacturer's recommendations.

E. Wood Flooring:

1. Install in accordance with manufacturer's and MFMA instructions.

2. Lay flooring parallel to length of main playing area. Blind nail or staple to subfloor.

3. Install edge strips at unprotected or exposed edges, and where flooring terminates.

4. Provide 2 inch expansion space at walls and other interruptions.

F. Install base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside corners.

G. Finishing:

1. Mask off adjacent surfaces before beginning sanding.

2. Sand flooring to smooth even finish with no evidence of sander marks. Remove dust by vacuum.

3. Apply finishes in accordance with floor finish manufacturer's and MFMA instructions.

4. Apply first coat, allow to dry, then buff lightly with recommended pad to remove irregularities. Vacuum clean and wipe with damp, lint-free cloth before applying succeeding coats.

5. Apply last coat of finish.

3.04 CLEANING

A. Clean floor surfaces in accordance with floor finish manufacturer's instructions.

3.05 PROTECTION

A. Prohibit traffic on finished floor for 72 hours after installation.

B. Place protective coverings over finished floors; do not remove coverings until Date of Substantial Completion.

END OF SECTION

OMIT

SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Pertinent sections specifying Concrete Floor Preparation, Concrete Floor Moisture Content & pH Testing and Water Vapor Emission Control Coating (Moisture Mitigation System).

1.03 REFERENCE STANDARDS

A. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

D. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.

E. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing.

F. ASTM F1344 - Standard Specification for Rubber Floor Tile.

G. ASTM F1861 - Standard Specification for Resilient Wall Base.

H. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code.

I. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

J. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Provide complete submittals at the same time as submittals for work in related sections to permit review of complete and integrated systems and assemblies.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

D. CAL-GREEN Submittals:

1. Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.
2. Product Data – Resilient Flooring: Documentation from an independent testing agency indicating compliance with the FloorScore Standard, or evidence of listing on the RFCI FloorScore database, or evidence of listing on the CHPS Product Registry.

E. Shop Drawings: Indicate seaming plan for sheet goods. Indicate floor pattern layout and color selections for each field and accent color. Request floor patterns from Architect where no patterns are indicated.

F. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

G. Verification Samples: Submit two samples, 8 inches by 10 inches in size illustrating color and pattern for each resilient flooring product specified.

H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove packaging and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space. Maintain temperature and humidity within manufacturer recommended limits.

C. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.07 EXTRA MATERIALS

A. See Section 01 6000 - Product Requirements, for additional provisions.

B. Provide 100 sq ft of flooring, 50 lineal feet of base, and 5 percent of installed stair materials of each type and color specified.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Resilient Flooring VOC Emission Limits: Comply with CAL-GREEN 5.504.4.6; products must be listed on one of the following databases.
1. Collaborative for High Performance Schools (CHPS) 2009 CA Criteria and Low Emitting Materials List (Product Registry); www.chps.net.
2. Resilient Floor Covering Institute (RFCI) FloorScore Program, database of certified products; www.scsglobalservices.com/services/floorscore.

C. Flooring along the accessible route shall be stable, firm, and slip-resistant per CBC 11B-302.1.

D. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.

2.02 TILE FLOORING

A. Luxury Vinyl Tile - LVT: Surface-decorated, with wear layer. Non-ortho Phthalate.
   1. Manufacturers:
      a. Mannington; Color Anchor LVT; www.manningtoncommercial.com.
      b. Substitutions: See Section 01 6000 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1700, of Class III, Type B.
   3. Tile shall be slip resistant.
   4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   5. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329; certified in accordance with ASTM D6329.
   6. Static Load - ASTM F970: Passes - 2,000 PSI; Residual Indent ≤ 0.005".
   7. VOC Content Limits: As specified in Section 01 6116.
   8. FloorScore Certified.
   9. Product Declarations: HPD, EPD.
   10. Size: 6 x 36 inches, nominal, or sizes as shown on Drawings.
   11. Total Thickness: 0.098 inch.
   12. Pattern: as indicated on Drawings, if no pattern is shown, request from Architect before making submittals.
   13. Color: To be selected by Architect from manufacturer's full range.

2.03 RESILIENT BASE

A. Base: Type TP, rubber, thermoplastic ASTM F1861 Type TP, Group 1; top set Style A - Straight at Carpet flooring, Style B - Coved at resilient flooring.:
   1. Manufacturers:
      a. BurkeBase®, Mannington Commercial: www.manningtoncommercial.com/burke.
      b. Johnsonite, a Tarkett Company: www.johnsonite.com.
      c. Roppe Corp: www.roppe.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Non-Ortho Phthalate.
   3. FloorScore Certified.
   4. Product Declaration: HPD available.
   5. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   6. Height: As indicated; 4 or 6 inch.
   7. Thickness: 0.125 inch.
   8. Finish: Satin.
   9. Length: Roll.
   10. Color: To be selected by Architect from manufacturer's full range.
   11. Accessories: Premolded external corners and internal corners.

2.04 WATER VAPOR EMISSION CONTROL COATING

A. Type specified in Section 07 2633.

2.05 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
   1. Exception: Provide grey cementitious types where required by flooring manufacturers.

B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

C. Moldings, Transition and Edge Strips: Rubber.
   1. Types as indicated or required for specific applications.

D. Filler for Coved Base: Plastic.

E. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

B. Cementitious Subfloors:
   1. Verify that substrates have been prepared and tested for moisture content and pH as specified in related sections.
   2. Verify preparation of substrate to specified flatness and levelness tolerances.
   3. Verify installation of Water Vapor Emission Control Coating (Moisture Mitigation System Coating) as specified in related section is complete.
   4. Verify that concrete sub-floor surfaces with Water Vapor Emission Control Coating are ready for resilient flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
      a. Test completed Water Vapor Emission Control Coating in accordance with ASTM F1869.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. If test results from Section 09 0512 are within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer, prepare floor substrates for installation of flooring in accordance with Section 09 0511 and as recommended by flooring and adhesive manufacturers.

B. If test results from Section 09 512 are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer, verify installation of Water Vapor Emission Control Coating as specified in Section 07 2633 is complete.

C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface. Repair damage to Water Vapor Emission Control Coating where occurs and re-test as specified in Section 07 2633.

D. Prohibit traffic until filler is fully cured.

E. Clean substrate.

F. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 Installation - General

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:
   1. Spread only enough adhesive to permit installation of materials before initial set.
   2. Fit joints and butt seams tightly.
   3. Set flooring in place, press with heavy roller to attain full adhesion.

D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
   2. Resilient Strips: Attach to substrate using adhesive.

F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

G. Install flooring in recessed floor access covers, maintaining floor pattern.

H. At movable partitions, install flooring under partitions without interrupting floor pattern.

3.04 Installation - Tile Flooring

A. Install in accordance with manufacturer's instructions.

B. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place, press with heavy roller to attain full adhesion.

E. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
   1. Lay grain all in one direction.

F. Install plank tile with a random offset of at least 6 inches from adjacent rows.

G. Lay out floor tile pattern for approval by Architect.

H. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

I. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

J. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.05 Installation - Resilient Base

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

C. Clean, seal, and wax resilient flooring in accordance with manufacturer's instructions using manufacturer recommended products.

3.07 PROTECTION AND ADJUSTING OF FINISHED WORK

A. Prohibit traffic on resilient flooring for 48 hours after installation.

B. Protect flooring during construction period in accordance with resilient flooring manufacturer's directions.
   1. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.
   2. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.

C. Adjusting: Following Owner's move-in, replace resilient flooring indicated as damaged by move-in operation, up to five percent of completed floor area.

3.08 SCHEDULE

A. Resilient tile patterns and colors (applies to vinyl and/or linoleum):
   1. Tile floors to have multiple color floor patterns. Lay out floors to floor patterns indicated. Where no pattern is indicated, Architect will provide pattern prior to installation.
   2. Allow for five-color patterns: Field color and four accents approximately equally proportioned.

END OF SECTION

SECTION 09 6700
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied flooring and base.

1. Medium Duty.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 07 9200 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.

D. Pertinent sections specifying Concrete Floor Preparation and Concrete Floor Moisture Content.

1.03 REFERENCE STANDARDS

A. ASTM C 307 - Standard Test Method for Tensile Strength of Chemical Resistant Mortar, Grouts, and Monolithic Surfacings.

B. ASTM C 413 - Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

C. ASTM C579 - Standard Test Method for Compressive Strength of Chemical Resistant Mortar, Grouts, Monolithic Surfacings and Polymer Concretes.

D. ASTM D570 - Standard Test Method for Water Absorption of Plastics.

E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.

F. ASTM D905 - Standard Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading.

G. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact), 2010.

H. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

I. MIL-PRF-24613A, Performance Specification: Deck Covering Materials, Interior, Cosmetic Polymeric (03 Nov 2007).

J. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

K. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

L. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, "CAL-Green".

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available ; and _____. Demonstrate compliance with specified attributes.

C. VOC Submittals:

1. Product Data - VOC Limits: For adhesives sealants, fillers and primers, documentation including printed statement of VOC contents.

D. Qualifications: For Manufacturer and Applicator. Demonstrate compliance with specified attributes.

E. Samples: Submit two samples, __8__by__8__ inch in size illustrating color and pattern for each floor material for each color specified.

F. Manufacturer's Installation Instructions: Indicate special procedures.

G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Top Coat Materials: 2 gallons.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Manufacturer's Applicators specializing in performing work of this section with minimum ten years experience.

C. Manufacturer’s representative shall be available to advise applicator on proper surface preparation and application techniques.

1.06 MOCK-UP

A. Construct mock-up(s) of fluid applied flooring to serve as basis for evaluation of texture and workmanship.

1. Number of Mock-Ups to be Prepared: One.

2. Use same materials and methods for use in the work.

3. Use approved design samples as basis for mock-ups.

4. Locate where directed.

5. Minimum Size: 48 inches by 48 inches.

B. Obtain approval of mock-up by Architect before proceeding with work.

1.07 MOCK-UP

A. Following review of complete submittals, Provide complete mock-up, 6 feet long by 6 feet wide, illustrating finish color and texture.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.09 PROJECT CONDITIONS

A. Sequence cabinet base and wall finish installation prior to fluid flooring to enable installation of integral coved flooring base in a single operation.

B. Coordinate fluid flooring installation with size, location and installation of service utilities.

1.10 FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F.

B. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fluid-Applied Flooring:

1. Crossfield Products Corp: www.crossfieldproducts.com/#sle.

2. Master Builders Solutions by BASF: www.master-builders-solutions.basf.us/en-us/#sle.

3. Sherwin-Williams Company: General Polymers Brand: www.generalpolymers.com.

4. Tera-Lite, Inc.; www.tera-lite.com

5. Stonhard, www.stonhard.com.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 Fluid-Applied Flooring SYSTEMS

A. VOC Limits for adhesives sealants, fillers, coatings and primers. Comply with limits specified in Section 01 6116.

B. Provide Fluid-Applied Flooring with specified adhesion to concrete floors at up to 100% Relative Humidity as measured by ASTM D 2170, in situ probe testing.

C. Fluid-Applied Troweled Flooring System, Medium Duty Type FF1: Epoxy, polymer modified, water-dispersed cementitious, three component, nominal 3/16 inch thickness.

1. Products:

a. Master Builder Solutions: Master Top 1254 (Selbatwede HD); www.master-builders-solutions.com.

b. Crossfield Products Corp: Cheminert CFS: www.crossfieldproducts.com.

c. Sherwin-Williams Company: General Polymers Brand; TPM 115-U1: www.generalpolymers.com.

d. Stonhard; Stoneshield HRI; www.stonhard.com.

e. Tera-Lite; Tera-Gem III Decorative Quality (DQ) Troweled.

f. Substitutions: See Section 01 6000 - Product Requirements.

2. Components:

a. Epoxy Primer: Manufacturer's standard penetrating two-component type.

b. Base Coat: 1/8 inch thick; selected color, three component mortar consisting of epoxy resin, curing agent and finely graded aggregates.

c. Undercoat (Receiving Coat): 100% solids epoxy formulation, three component, free-flowing.

d. Top Coat: Epoxy, single component; UV resistant, 1/16 inch thick; clear color.

e. Non-slip Surfacing: Quartz Aggregate, manufacturer's standard integral color type, suitable for broadcast application, selected color blend. Install to produce Coefficient of Friction between 0.7 and 0.8

3. Performance Criteria:

a. Tensile Strength: 1,700 psi, when tested in accordance with ASTM D 307.

b. Compressive Strength: 10,000 psi, when tested in accordance with ASTM C 579.

c. Water Absorption: <0.1 percent, when tested in accordance with ASTM C 413 for 24 hr.

d. Mildew Resistance: No growth.

e. Adhesion in Shear (Bond) Strength: 300 PSI or failure of concrete bond minimum, when tested in accordance with ASTM D4541.

f. Impact Resistance: 60 in/lb; no cracking, chipping or delamination, when tested in accordance with ASTM D2794 or MILPRF24613.

g. Flammability: Self-Extinguishing (Class I) per ASTM E648.

h. Color: Selected from full range of available colors. Minimum of 7 colors in product line.

i. VOC Content: 100 g/l or less.

j. Coefficient of Friction, Installed: 0.60 minimum, wet, measured in accordance with ASTM D2047.

D. Topical Vapor Control Coating for Fluid Flooring: Cementitious, polymer-modified three component, nominal 1/16 - 1/ 8 inch thickness, compatible with fluid-applied flooring. Allow successful installation of fluid applied flooring over concrete of 100 % Relative Humidity as measured by ASTM D2170 in situ probe.

1. Primer: Manufacturer's standard penetrating type.

2. Base Coat: 1/8 inch thick; selected color, polymer-modified mortar consisting of liquid latex resin and finely graded aggregates.

2.03 FINISHES

A. Color(s) as selected by Architect from:

1. Manufacturer’s full range of standard colors.

B. Multiple color selections will be required as shown on the Drawings. If none are shown, request from the Architect.

2.04 ACCESSORIES

A. Base caps: Type recommended by manufacturer for conditions required.

B. Cant Strips: Molded of flooring resin material.

C. Primer: Type recommended by manufacturer for substrate and body coats indicated.

D. Patching and Fill Material: Resinous product of or approved by epoxy coating manufacturer and recommended by manufacturer for application indicated.

E. Sealant: manufacturer's recommended type, suitable for conditions required.

F. Cleaners: Heavy-duty industrial detergent, manufacturer's recommended type, suitable for conditions required.

G. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Cementitious Subfloors:

1. Verify that substrates have been prepared and tested for moisture content and pH as specified in related sections.

2. Verify preparation of substrate to specified flatness and levelness tolerances as specified in related sections.

3. Verify substrate has been mechanically cleaned and surface profiled as specified in related sections.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of materials to sub-floor surfaces.

C. Verify that sub-floor surfaces are sloped to drain, free of ponding areas or conditions which would impair positive drainage when installation is complete. Flood-test with water to confirm free drainage.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Crack Repair: Repair concrete slab cracks as recommended, using materials recommended by the flooring manufacturer and included in their warranty. Quantity Allowance: One lineal foot of crack repair per square foot of floor installation.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface with positive drainage configuration. Grind irregularities above the surface level. Prohibit traffic until filler is cured.

C. Vacuum clean substrate.

D. Apply primer to surfaces required by flooring manufacturer.

E. Install topical vapor control coating for fluid flooring complete with primer and recommended accessories at all areas indicated to receive fluid-flooring.

3.03 INSTALLATION - Accessories

A. Install cant strips at base of walls where flooring is to be extended up wall as base.

B. Install terminating cap strip at top of base; install "H" or "T" channel configurations as required to suit specific conditions where wall panel finishes abut base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.

B. Apply each coat to minimum thickness required by manufacturer, free from trowel marks, swirls, pooled glaze or imperfections. Completed mock-up shall serve as appearance and texture standard for completed work.

C. Apply first coat of clear sealer and broadcast aggregate to refusal and allow to cure as required by manufacturer. Sweep off excess aggregate and apply second seal coat to obtain specified thickness and surface finish textures matching approved mockups.

D. Finish to smooth level surface with positive drainage as indicated. No ponding or birdbaths, all surface water flows to drain.

E. Fillet and cove at vertical surfaces.

F. Install sealants at perimeter and transition conditions in accordance with manufacturer's standard details and installation recommendations.

3.05 FIELD QUALITY CONTROL

A. Following manufacturer's recommended curing period, and prior to installation of further work, flood completed floor with water in presence of Owner's Inspector to verify positive drainage.

B. Completed work shall exhibit positive drainage, free from ponding or "birdbaths", with uniform color and texture consistent with the granular character of the flooring material, free of pooled,"swirled", or glazed topcoat, with surface finish textures matching approved mockups.

C. Immediately remove and replace work not conforming to these requirements.

D. Adjust textures at no cost to Owner at locations where finish textures do not match approved mockups:

1. Too Rough: Apply additional coats of glaze topcoat until texture is acceptable.

2. Too Smooth: Apply additional broadcast of aggregate and lock-in with additional glaze top coat until texture is acceptable.

3.06 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Barricade area to protect flooring until fully cured.

3.07 SCHEDULE

A. Epoxy Floor Coating - Medium Duty: Total Assembly thickness 3/16 inch (188 mil) minimum.

1. Surface Preparation - Concrete: SSPC-SP13 / NACE No. 6 Surface Preparation of Concrete, minimum concrete surface profile (CSP) 4-6 per ICRI Technical Guideline 03741, as recommended by Fluid Flooring Manufacturer.

2. Repair cracks.

3. Topical Vapor Control Coating: If floor substrate Relative Humidity is outside manufacturer’s recommended range, apply Topical Vapor Control Coating to horizontal surfaces, over prime coats as recommended by Manufacturer.

4. Primer: Apply prime coats to surfaces if recommended by Manufacturer.

5. Mortar / Slurry Base Coat: 3/16 inch (188 mils) DFT.

6. Color Finish / Topcoat: Color as selected; 8.0 to 12.0 mils DFT.

7. Integral Color Aggregate Broadcast to Refusal.

8. Clear Topcoat, minimum two: 8.0 to 12.0 mils DFT, total.

END OF SECTION

OMIT

SEC 6813
TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, fully adhered.Walk Off locations

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 7419 - Construction Waste Management and Disposal: Reclamation/Recycling of new carpet tile scrap.

C. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Shop Drawings: Indicate layout of joints.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Accessory Samples: Submit two ____ inch long samples of edge strip, base cap, stair nosing, and _____.

F. Sustainable Design Submittal: Submit VOC content documentation for adhesives.

G. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and _____.

H. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

I. Manufacturer's Qualification Statement.

J. Installer's Qualification Statement.

K. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

L. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

1.05 QUALITY ASSURANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Tile Carpeting:

1. Interface, Inc; ____: www.interface.com/#sle.

2. Mannington Commercial; Ruffian II: www.manningtoncommercial.com#sle.

3. Milliken & Company; ____: www.milliken.com/#sle.

4. Mohawk Group; ____: www.mohawkgroup.com/#sle.

5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Tile Carpeting, Type Walk Off: Tip-Sheared Patterned Loop, manufactured in one color dye lot.

1. Product: Ruffian II manufactured by Mannington Commercial.

2.03 ACCESSORIES

A. Subfloor Filler: _____; type recommended by flooring material manufacturer.

B. Edge Strips: Rubber, _____ color.

C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).

1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

D. Vacuum clean substrate.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install carpet tile in accordance with manufacturer's instructions.Quarter turn pattern

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Trim carpet tile neatly at walls and around interruptions.

F. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Materials for backpriming woodwork.

D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Prime surfaces to receive wall coverings.
   3. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Pertinent sections of Division 05 specifying shop-primed and galvanized metal items.

C. Section 09 9113 - Exterior Painting.

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

C. Manufacturer's recommendations and specifications, including installation instructions.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.

E. SSPC-SP 1 - Solvent Cleaning.

F. SSPC-SP 2 - Hand Tool Cleaning.

G. SSPC-SP 6 - Commercial Blast Cleaning.

H. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015).

1.05 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
   6. Resin Type.
   7. Total VOC Content in grams per liter.
   8. Solids Content By Volume SCBV (not solids by weight). All products shall be minimum 35% SCBV.
   9. Composition-By-Weight. Demonstrate composition by percentage related to total weight of all components.
   10. Film Thickness Per Coat, Wet and Dry.
   11. Prime Pigment: Demonstrate prime pigment by percentage related to total volume of all components.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
   3. Allow 30 days for approval process, after receipt of complete samples by Architect.
   4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as factory finished metals, wood cabinets, wood doors, and wall coverings and tile, have been approved.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten (10) years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five (5) years experience and approved by manufacturer.

1.07 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 8 feet long by 10 feet wide, illustrating paint color, texture, and finish.

C. Provide door and frame assembly illustrating paint color, texture, and finish.

D. Locate where directed by Architect.

E. Final color selections and acceptance will be made only after review of mock-ups under lighting conditions approximating finish conditions.

F. Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 DESIGN REQUIREMENTS

A. Design Intent: Paint all exposed surfaces of Work, whether or not the item or surface is specifically identified within the Contract Documents.
   1. The number of coats specified is the minimum to be applied. Provide paint finishes of even, uniform color, free from cloudy or mottled surfaces. Provide one additional coat if necessary where "deep colors" are selected.
   2. Non-scheduled items: Provide manufacturer's approved and recommended system as set forth in Manufacturer's "Specifications Architectural Finishes ".

2.02 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Dunn Edwards; www.dunnedwards.com.
   3. Kelly-Moore: www.kellymoore.com.
   4. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 01 6000 - Product Requirements.

2.03 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect after award of contract.
   2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
   3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
   4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
   5. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.04 PAINT SYSTEMS - INTERIOR - METALS

A. Paint MI-OP-3A - Ferrous Metals, Primed or Unprimed, Alkyd, 3 or 4 Coat:
   1. One coat of alkyd primer:
   2. Two (or more) coats of Alkyd Enamel, as required to achieve specified appearance. Provide sheen as specified and number of coats as required to achieve specified appearance; Gloss (Handrails and Guardrails), Semi-gloss (All other surfaces). Sheen selected by Architect.
   3. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   4. Dunn Edwards Products:
      a. BLOC-RUST Premium BRPR00 Red or White Oxide, as required for finish color selection.
      b. One coat or as required to achieve specified appearance, ARISTOSHIELD Series High-Gloss ASHL70 Water-Oil Hybrid Int/Ext, or as required for specified sheen.
   5. Kelly-Moore Products:
      a. Rust-Oleum CV740, Alkyd Metal Primer.
      b. Two coats, 1999 Epic Water Urethane Modified Alkyd Gloss Enamel or as required for specified sheen.

B. Paint MI-OP-3L - Ferrous Metals, Primed or Unprimed, Latex, 3 Coat: Surfaces 8 feet or more above finish floor, trusses, metal roof deck, ductwork.
   1. One coat of alkyd primer:
   2. 2 coats of latex enamel; sheen as selected by Architect.
   3. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   4. Dunn Edwards:
      a. BLOC-RUST Premium Red or White Oxide, as required for finish color selection.
      b. EVERSHIELD EVSH60 100% Acrylic Gloss Enamel Series or SPARTAWALL SWLL50, as required for specified sheen.
   5. Kelly-Moore Products:
      a. Rust-Oleum CV740 Alkyd Metal Primer.
      b. KM 1680 Series DURA-POXY + 100% Acrylic Enamel or 1650 ACRY-PLEX Low VOC Interior 100% Acrylic Semi-Gloss Enamel as required for specified sheen.

C. Paint MgI-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
   1. Pretreatment: reduce to minimum level for finish coat adhesion.
   2. One coat alkyd metal primer.
   3. Two coats of alkyd enamel, sheen as selected by Architect.
   4. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   5. Dunn-Edwards Products:
      a. DE Krud Kutter Metal Clean and Etch.
      b. DE ULTRASHIELD Galvanized Metal Primer ULGM00.
      c. DE ARISTOSHIELD ASHL70 Water-Oil Hybrid Int/Ext Series, High-Gloss or as selected by Architect.
   6. Kelly Moore Products:
      a. Krud Kutter Metal Clean and Etch.
      b. KM 5725 DTM Primer / Finish.
      c. KM1998 / 1999 Epic Water Urethane Modified Alkyd Gloss Enamel.

D. Paint MgI-OP-3L - Galvanized Metals, Latex, 3 Coats: Surfaces 8 feet or more above finished floor, metal roof deck, ductwork, etc.
   1. Pretreatment: Solvent wash to remove oily residue, ensure finish coat adhesion.
   2. One Coat Galvanized Primer.
   3. Two Coats Latex Enamel; sheen as selected by Architect
   4. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   5. Dunn-Edwards Products:
      a. Pretreatment as recommended by topcoat manufacturer.
      b. DE ULTRASHIELD Galvanized Metal Primer ULGM00.
      c. DE SPARTASHIELD SSHL60 Series 100% Acrylic Enamel, as required for specified sheen.
   6. Kelly Moore Products:
      a. Pretreatment as recommended by topcoat manufacturer.
      b. KM 5725 DTM Acrylic Primer / Finish.
      c. KM : 1680 DURA-POXY + 100% Acrylic Gloss Enamel, as required for specified sheen.

2.05 PAINT SYSTEMS - INTERIOR - WOOD

A. Paint WI-OP-3L - Wood, Opaque, Latex, Low-VOC 3 Coat: Cedar, redwood, architectural glue-laminated beams, typical interior wood trim with opaque finish. Provide number of coats necessary for stain resistance and uniform color.
   1. One coat of latex primer sealer.
   2. Two coats of latex enamel; . Sheen selected by Architect.
   3. Dunn-Edwards Products:
      a. DE INTER-KOTE Wood Primer IKPR00.
      b. DE SPARTAWALL 100 % Acrylic Semi-Gloss SWLL50 Series.
   4. Kelly-Moore Products:
      a. KM 973 Acryplex Low VOC Interior Enamel Undercoat.
      b. KM 1050 Series Premium Professional Low VOC Interior Acrylic Latex.

B. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat: Typical exposed interior beams above 8'-0".
   1. One coat of latex primer sealer.
   2. Two coats of latex enamel. Sheen selected by Architect.
   3. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   4. Dunn-Edwards Products:
      a. Dunn-Edwards: INTER-KOTE Premium IKPR00.
      b. Dunn-Edwards: SPARTAWALL SWLL30.
   5. Kelly-Moore Products:
      a. Kelly-Moore: 973 Acry-Plex Zero VOC Interior Undercoat .
      b. Kelly-Moore: "KM 1010 Premium Professional Zero VOC Eggshell Enamel".

2.06 PAINT SYSTEMS - INTERIOR - GYPSUM AND PLASTER

A. Paint GI-OP-3E - Gypsum Board, Plaster, Epoxy, 3 Coat:
   1. One coat of synthetic resin primer sealer, quick dry, pigmented.
   2. Two coats of two-component acrylic epoxy enamel; Semi-gloss sheen, or as selected by Architect.
   3. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   4. Dunn Edwards Products:
      a. DE Vinylastic W101.
      b. DE Rustoleum S-50.
   5. Kelly Moore Products:
      a. KM MonoChem Aqua Prime Primer
      b. KM MonoChem 200 WB Epoxy Coating

B. Paint GI-OP-3A-L Gypsum Board/Plaster, Acrylic, Low-VOC, 3 Coat:
   1. One coat of low odor/low-VOC vinyl acrylic primer sealer: pigmented.
   2. Two coats of low odor / low-VOC acrylic, sheen as selected by Architect.
   3. Note: Surfaces that prepared to a Level 5 Finish, using the Level 5 Primer/Prep Coat as specified in Section 09 2116 “Gypsum Board Assemblies", may omit primer coat specified above when topcoat manufacturer confirms in writing that this primer is compatible with the finish coats as specified.
   4. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   5. Dunn-Edwards Products:
      a. DE VINYLASTIC Premium VNPR00.

b. DE SPARTAWALL 100 % Acrylic Semi-Gloss SWLL50 Series as required for specified sheen.

6. Kelly Moore Products:
   a. KM 971 Acry-Plex Low VOC Interior PVA Primer/Sealer.
   b. KM 1010 Premium Professional Interior 100% Acrylic Enamel Series, as required for specified sheen.

C. Paint GI-P-1A - Gypsum Board/Plaster, Alkyd Primer, 1 Coat: Preparation for application of Wall Covering.
   1. One coat of primer sealer.
   2. If any of the products below are discontinued, submit alternate products approved by the Manufacturer in writing.
   3. Dunn-Edwards Products:
      a. DE ZINSSER Shieldz Universal Wallcovering Primer.
   4. Kelly Moore Products:
      a. KM 265 Water-Oil Hybrid Int/Ext Primer Undercoat.

2.07 PAINT SYSTEMS - INTERIOR - OTHER

Not USED

2.08 PRIMERS

A. Primers: As required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
   1. If products specified are discontinued, submit alternate product approved by specified Manufacturer in writing.

2.09 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Sanding materials: 120-180 grit, for architectural woodwork, finish carpentry, wood doors, or other surfaces requiring touch-up.

C. Patching Material: Latex filler.

D. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the manufacturer-recommended maximums.

3.02 PROTECTION OF ADJACENT WORK

A. Protect surrounding elements from damage from painting procedures. Provide temporary facilities and barricades required. Additional requirements specified in Division 01.

B. Carefully remove and store removable items located in areas to be painted, including fixtures, fittings, finish hardware, and accessories; reinstall upon completion.

C. Separate areas to be protected from painting areas using means adequate to prevent damage.

D. Cover existing interior planters and landscaping with tarpaulins or similar covers.

E. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

3.03 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

H. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

I. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

J. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

K. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

L. Tackable Substrates for Wall Coverings: Prepare as for gypsum board.

M. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

N. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.

2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

O. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

P. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.

Q. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.04 PREPARATION - EXISTING SURFACES

A. General: As specified above and as follows below.

B. Remove or repair existing coatings that exhibit surface defects. Feather-edge patches to make finished edges inconspicuous.

C. Existing Cement Plaster Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Surfaces to be clean, dry, free of dirt, dust, grease, oil, mildew, efflorescence and other contaminants affecting paint adhesion or performance. Completely remove all loose, peeling or checked paints by power-washing, scraping or other methods. Spot-prime and point-up cracks, voids or other surface fissures by methods recommended by paint manufacturer. Spot-prime again following patching. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

D. Existing Gypsum Board Surfaces to be Painted: Remove dirt, loose texturing, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Surfaces to be clean, dry, free of dirt, dust, grease, oil, mildew, efflorescence and other contaminants affecting paint adhesion or performance. Completely remove all loose, peeling or checked paints by sanding, scraping or other methods. Fill all holes and defects with suitable patching or spackling material compatible with the substrate material, allow to completely dry and sand to approximate existing adjacent textures. Spot prime patched areas.

E. Existing Metal Surfaces With Existing Coatings to be Recoated; sheet metal flashings and trim, hollow metal doors, frames, columns and similar items. Sand and scrape to remove existing finishes, loose primer and rust. Clean surfaces with solvent. Prime bare metal surfaces. Feather edges to make touch-up patches inconspicuous.

F. Existing Wood to Receive Opaque Finish: Completely remove all loose, peeling chalking, flaking or peeling paint by pressure-washing, scraping, wire brushing, sanding or other appropriate methods which will not damage existing substrates or adjacent finishes. Dull glossy surfaces to provide roughened surface for proper adhesion. Remove all loose sealant and glazing compounds. Feather back rough paint edges and weathered wood material by sanding. Spot prime all areas before and after application of new sealants, patching or glazing materials. Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior sealant compound after prime coat has been applied. Remove mildew growth as recommended by paint manufacturer.

G. Existing Metal Doors to be Painted Sand, patch, clean with solvent. Prime metal door top and bottom edge surfaces. Finish otherwise as for Existing Metal Surfaces with Existing Coatings to be Recoated.

3.05 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.06 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.07 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.08 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.09 SCHEDULE - SURFACES NOT REQUIRING PAINTING BY THIS SECTION

A. Do Not Paint or Finish the Following Items:
   1. Items factory-finished except those specifically noted in this section to be finished; materials and products having factory-applied primers are not considered factory finished.
   2. Equipment, ductwork, conduit and electrical items, with factory finishes suitable for interior exposure, where concealed from public or occupant view in custodial or utility spaces.
   3. Items indicated to receive other finishes.
   4. Items indicated to remain unfinished.

5. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead items.
7. Marble, granite, slate, and other natural stones.
8. Ceramic and other types of tiles.
9. Pre-finished wall, ceiling, roof and floor materials or coverings, unless specifically scheduled for field painting, including, but not limited to:
10. Floors, unless specifically indicated.
11. Concrete, cast stone, integrally colored plaster and stucco unless specifically indicated.
12. Glass.
13. Concealed pipes, ducts, and conduits.

3.10 SCHEDULE - SURFACES TO BE FINISHED

A. General: Paint the surfaces described below under Schedule - Paint Systems. All surfaces exposed to interior atmosphere, or visible to the eye, unless specifically excluded by the Article titled "Do Not Paint or Finish the Following Items". If a coating system is not specified for a particular surface or substrate, provide a three-coat finish system recommended by the paint or coating manufacturer for that surface or substrate. Include all preparation necessary as appropriate for a similar substrate listed in the Article titled "PREPARATION", or preparation for that substrate as recommended by the paint or coating manufacturer.

B. Mechanical and Electrical: Use paint systems defined for the materials to be finished.
   1. Paint all conduit, insulated and exposed pipes, boxes, hangers, brackets, collars and supports, mechanical equipment, electrical equipment, and exposed ducts occurring in finished areas to match background surfaces, unless otherwise indicated.
   2. Paint shop-primed items occurring in finished areas.
   3. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
   4. Paint dampers exposed behind louvers, grilles, to match face panels.

C. Paint behind moveable equipment and furniture.

D. Finish top, bottom, and side edges of interior doors the same as exposed faces.

E. Paint access doors, fire hose and extinguisher cabinets, panelboards, conduits and exposed plumbing piping.

F. Paint exposed metal decks.

G. Paint reveal moldings, expansion joints, and handrails.

H. Paint tube column and miscellaneous connections.

I. Provide split finishes for painted doors and interior windows where different connected room colors are selected.

J. Paint continuous surfaces with the same paint system. Do not change systems at elevation breaks.

K. Touch-up factory paint finishes where damaged.

L. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

3.11 SCHEDULE - INTERIOR PAINT SYSTEMS

A. Gypsum Board: Finish all surfaces exposed to view, GI-OP-3A..
   1. Interior Ceilings and Bulkheads: Flat sheen.
   2. Interior Walls: Semi-gloss Sheen at Toilet Rooms, Custodians, Storage Room, Food Service.
   3. Interior Walls: Eggshell at Classrooms, Corridors, Admin Offices and Work Rooms.

B. Wood: Finish all surfaces exposed to view.
   1. Interior Opaque Finish: WI-OP-3L
      a. Trim and frames: Semi-gloss sheen.
      b. Beams: Low Sheen.

C. New Wood Doors: Factory-finished.

D. Steel Doors and Frames: Finish all surfaces exposed to view and to weather, including door tops and bottoms. Select prime coats compatible with finish color selections. MI-OP-3A.
   1. Semi-gloss sheen.

E. Metal Fabrications, Galvanized Steel and Shop-Primed Metal Items: Finish all surfaces exposed to view and concealed, before installation, including exposed portions of metal roof or floor deck assemblies.. Select prime coats compatible with finish color selections. MI-OP-3A for surfaces under 8 feet above floor. MI-OP-3L for surfaces over 8 feet above floor.
   1. Interior - Handrails and exposed spiral seamed ductwork: Gloss sheen.
   2. Interior - All Other Surfaces: Semi-gloss sheen.

F. Miscellaneous metals, conduits, non-factory-finished access panels: As specified for either unprimed or shop primed metals, modified as required to make sheen match adjacent surfaces.
   1. Finish the following items:
      a. Exposed surfaces of lintels.
      b. Exposed surfaces of steel stairs, ladders, fences, gates and railings.
      c. Mechanical equipment.
      d. Electrical equipment.

H. Wall and Substrate Surfaces Under Wall Covering: GI-P-1A.

3.12 SCHEDULE - COLORS

A. Interiors, allow individual schedule for each Building:
   1. Walls; Field color as selected.
   2. Ceilings/soffits; as selected, allow for deep tones.
   3. Wainscot; as selected, allow for deep tones.
   4. Accent walls; as selected, allow for deep tones.
   5. Paint access doors and panels same as walls and wainscots.
   6. Wood Trim; as selected, allow for deep tones.
   7. Accent members; as selected, allow for deep tones.
   8. Doors and Frames; as selected, allow for deep tones and split finishes exterior/interior.
   9. Doors and Frames for Utility or staff access only, as selected; match walls/wainscot.
   10. Guardrails, handrails; as selected.
   11. Exposed trusses or structural members; as selected, allow for deep tones.
   12. Exposed ductwork; as selected, allow for deep tones.
   13. Mechanical or other equipment exposed to view; as selected or match wall/wainscot as directed.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room and door signs with raised tactile letters and braille.

B. Interior directional and informational signs with raised tactile letters and braille.

C. Vinyl Graphics.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Division 08: Pertinent sections specifying doors and glazing materials serving as the mounting surface for signage.

D. Division 09: Pertinent sections specifying wall finishes and substrates serving as the mounting surface for signage.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design.

B. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

C. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, “CAL-Green”.

D. Standards for jurisdiction where project is located.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. CAL-GREEN Submittals: Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

D. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.

2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.

3. Submit for approval by Owner through Architect prior to fabrication.

E. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.

1. Submit shop drawing at scaled size for each typical sign. Indicate: Proposed copy, letter height, spacing and location of lettering on the sign field, colors and materials of each element and lettering. Tabular listing of signage and copy alone is not acceptable.

2. Submit tabular listing for each sign keyed to location indicated on drawings, including all text and adjacent space for Owner modification/confirmation of text.

3. Provide all drawings and detail documents necessary to complete the project.

4. Where sizes for signs are impacted by dimensions of surfaces or locations on which they are to be installed, verify dimensions by field measurement. Indicate measurements and signage locations on shop drawings for approval prior to production.

5. Indicate for monument sign: Member and material profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details

F. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

G. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

H. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum Five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

B. Conform to applicable code for requirements..

1. C.C.R., Title 24, Part 2. California Building Code, Sections 1009.8, 1009.9, 1023.8, 1023.9, 1023.10 and 11B-703 for requirements governing signage design, location and attributes.

2. Braille Symbols: California Contracted Grade 2 Braille symbols shall be used per CBC 11B-703.3. Provide only domed Contracted Grade 2 Braille symbols with dimensions in accordance with Table 11B-703.3.1.

3. Signs shall be field-inspected per CBC 11B-703.1.1.2.

C. It is the sole responsibility of the signage contractor to obtain all permits required for signage contained in this project. Signage contractor to obtain, provide, produce and process all documentation, and pay all fees required for the permitting process.

2.02 MANUFACTURERS

A. Plaque Signs:

1. Rowmark, LLC.;Product DurMark; www.rowmark.com

2. Substitutions: See Section 01 6000 - Product Requirements.

B. Vinyl Graphics:

1. 3M / Commercial Products Division; Product 3M Premium Grade Vinyl: 3M Center, Building 220-6W-06, Post Office Box 33220, St. Paul, Minnesota 55133-3220: Telephone 800-374-6772.

2. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.

1. Sign Type: Flat signs with engraved panel media as specified.

2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.

3. Character Height: 1 inch.

4. Sign Height: 3 inches, unless otherwise indicated.

5. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.

6. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille, provide separate Facility Identification Symbols on doors as shown on Drawings.

C. Interior Directional and Informational Signs:

1. Sign Type: Same as room and door signs.

2. Lift Signage: Pictograms and copy shown on Drawings.

3. Room Occupancy Signage: All rooms with Occupant Load greater than 50. Verify actual numbers with Architect.

4. Tactile Exit and Exit Route Signs: Raised letters and Braille as specified for Room and Door signs.

5. Exit Stair and Exit Ramp Signs: Raised letters and Braille as specified for Room and Door signs.

6. Assistive Listening Sign: Pictogram and copy shown on Drawings.

7. Other sign types indicated on the Drawings.

8. Wording of signs is scheduled on drawings.

2.04 PLAQUE SIGNS

A. Plaque Signs: One piece aluminum metal construction with raised character copy and braille with thermal-set, polyurethane finish. Tactile legends and Braille shall comply with Americans with Disabilities Act (ADA) , Califiornia Building Code (CBC) and requirements indicated for quantities, sizes, layouts, materials, finishes, color, etc. as specified in the Graphics Schedule and Drawings/Specifications.

1. Exterior durability rating: 3 years minimum.

2. Painted Finish:

a. Weatherability: When tested in acordance with ASTM G 53, after 500 hours in a Weatherometer (equivilent to 3 years of esterior esposure) gloss retention of not less than 88.0 determined in accordance with ASTM D 523 as a 60 degree angle.

b. Color Fade Resistance: Color shall not change more than 1.68 units determined in accordance with ASTM D 2244 and measured with a Hunter colormeter, Model D25.

c. Durability: Sign finish shall show no effect after requested use of cleaners such as Graffiti Remover #1120 manufactured by Fine Organics Corp., Lodi, NJ.

3. Colors: Custom, as selected by Architect.

4. Total Thickness: .

5. Sign Edges: Square. Sign edges at geometric symbols shall be eased or chamfered in accordance with governing code.

B. Raised Characters:

1. Comply with applicable provisions of ANSI/ICC A117.1, including Braille.

2. Character Color: As selected by Architect..

3. Character Font: As Indicated.

4. Character Stroke Width: As required by referenced codes, 1/8 inch.

5. Character Height: As indicated. If not shown, provide 1 inch.

6. Character Edges: Square.

7. Character Case: Upper case only.

2.05 VINYL GRAPHICS

A. Adhesive Vinyl Graphics of International Symbol of Accessibility (ISA) for installation on glass or similar substrates.

B. Base Material: Premium Grade with an outdoor durability rating of five years.

1. Color: Provide as shown on Drawings. If no colors are indicated, provide International Blue with white pictograms..

2.06 ACCESSORIES

A. Interior Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Exterior Screws: Stainless steel.

C. Mounting Hardware: Vandal-proof screws, stainless steel, size recommended by manufacturer to suit applications and resist applied loads.

D. Adhesive: 3M Corporation, "VHB", applied in 5 mil thickness covering entire back of sign plaque without void or bubble.

E. Silicon Adhesive: Silglaze II #2801 GE Clear - Silicone Sealant / Adhesive.

F. Accessories and materials required for complete installation as indicated.

PART 3 EXECUTION

3.01 COORDINATION

A. For signs supported by or anchored to permanent construction such as building such as building fascias, advise installers about specific requirements for placement of anchorage devices and similar items to be used for attaching signs.

3.02 EXAMINATION

A. Confirm visibility of site signage and graphics in indicated locations. Do not install signs in locations where they will not be visible or where they will obstruct visibility of other related building elements, such as exit signage or life safety equipment provided under other contracts or sections. Request direction from Architect in the event of conflict with signage and building elements.

B. Verify that substrate surfaces are ready to receive work.

C. Clean substrates to receive adhered vinyl graphics or tape adhesive using means recommended by adhesive manufacturer that will not damage substrates. Remove contamination and materials that might impede film adhesion.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install signs after surfaces are finished, in locations indicated.

C. Install neatly, with horizontal edges level.

D. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

E. Install signage and graphics plumb, level and proportionally spaced or kerned as required for uniform appearance; centered on, or aligned with related building elements, measured from established lines and levels, accurately fitted, free from distortion or defects.

F. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing items to in-place construction; including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

G. Install vinyl graphics on clean substrates in accordance with vinyl manufacturer instructions, flat, smooth, free of defects, bubbles dust, blemishes and air pockets.

H. Plaque Mounting on Glazing: Install on glazing with double stick tape and silicone adhesive. Provide self-adhesive opaque plastic film, in matching or contrasting color as selected, to conceal reverse side of signs mounted on glazing. No exposed fasteners, adhesives or glazing tapes permitted. Film backer must be computer cut to match the shape of the plaque(s).

I. Plaque Mounting at all other interior locations: Provide double stick tape and silicone.

J. Plaque Mounting at all other exterior locations: Provide double stick tape and anchorage devices and fasteners as necessary for securing items to in-place construction; including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws, wedge anchors and other connectors as required.

3.04 ADJUSTING

A. Correct all damaged work by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Protect from damage until Substantial Completion; repair or replace damaged items.

3.05 SCHEDULES

A. Refer to Graphics Plans, Schedules and Details on the Drawings.

END OF SECTION

SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

B. Urinal and vestibule screens.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Blocking and supports.

B. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.04 ADMINISTRATIVE REQUIREMENTS

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Solid Plastic Toilet Compartments:

1. Scranton Products; Aria Partitions: www.scrantonproducts.com/#sle.

2. Substitutions: Section 01 6000 - Product Requirements.

2.02 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted unbraced.

1. Doors:

a. Thickness: 1 inch.

b. Width: 24 inch.

c. Width for Handicapped Use: 36 inch, out-swinging.

d. Height: 55 inch.

2. Panels:

a. Thickness: 1 inch.

b. Height: 55 inch.

3. Pilasters:

a. Thickness: 1 inch.

b. Width: As required to fit space; minimum 3 inch.

END OF SECTION

SECTION 10 2800
TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Commercial shower and bath accessories.

C. Under-lavatory pipe supply covers.

D. Electric hand/hair dryers.

E. Utility room accessories.

F. Installation of Owner furnished accessories.

1.02 RELATED REQUIREMENTS

A. Pertinent sections specifying concealed supports and blocking for accessories, including in wall framing and plates, above ceiling framing, and locations required.

B. Section 10 2113 - Plastic Toilet Compartments

C. Divisions 22 and 26: Pertinent sections specifying plumbing and electrical work.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design.

B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures.

C. C.C.R., Title 24, Part 2, California Building Code for accessibility standards.

D. Manufacturer's recommendations and specifications.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

F. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

H. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

I. ASTM C1036 - Standard Specification for Flat Glass.

J. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

K. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping.

L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

M. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

N. ICC A117.1 - Accessible and Usable Buildings and Facilities.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.06 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:

1. Bobrick Washroom Equipment, Inc.

2. American Specialties, Inc: www.americanspecialties.com.

3. Bradley Corporation: www.bradleycorp.com/#sle.

4. Tubular Specialties Manufacturing, "TSM".

B. Provide products of each category type by single manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

1. Grind welded joints smooth.

2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide two keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

F. Adhesive: Two component epoxy type, waterproof.

G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

C. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 Commercial Toilet Accessories

A. Toilet Paper Dispenser: Roll-in-reserve type, designed to allow automatic activation of reserve roll when needed, or manual activation by pressing release bar, surface-mounted, stainless steel unit with pivot hinge, tumbler lock.

1. Products:

a. Bobrick B-2888.

b. Unit shall be continuous flow type per CBC 1115.

B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.

1. Capacity: 400 multifold minimum.

2. Products:Bobrick Classic Series Model B-262

C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.

1. Minimum Capacity: 40 ounces.

2. Compliance: Valve operates with one hand, without tight grasping, pinching or twisting of the wrist and with less than 5 pounds of force (22.2N) to comply with universal/accessibility design, including ADA-ABA and ICC/ANSI

3. Products:Bobrick Classic Series Model B-2112

D. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.

1. Size: as indicated.

2. Frame: 0.05 inchangle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.

3. Product: B-2908 manufactured by Bobrick.

E. Seat Cover Dispenser: Stainless steel, surface-mounted, reloading by concealed opening at base, tumbler lock.

1. Minimum capacity: 500 seat covers.

2. Products: ADA Compliant toilet seat cover Dispenser Bobrick Classic Series B-221

F. Grab Bars: Stainless steel, 1-1/4 min. to 2 max. inches outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.

1. Conform to CBC accessiblity requirements and referenced standards, support vertical loading of 400 pounds and horizontal loading of 250 pounds per CBC 11B-609.8, applied at any portion of the bar.

2. Length and configuration: As indicated on drawings.

3. Product: B5806 manufactured by Bobrick.

G. Combination Sanitary Napkin/Tampon Dispenser: Stainless steel, surface-mounted, push button, battery operated, ADA compliant operation with one hand, not requiring tight grasping or pinching or twisting of the wrist..

1. Door: Seamless 0.05 inch door with returned edges and tumbler lock.

2. Cabinet: Fully welded, 0.03 inch thick sheet.

3. Operation: 25 cent coin required to operate dispenser. Provide locked coin box, separately keyed.

4. Identify dispensers slots without using brand names.

5. Minimum capacity: 30 napkins and 36 tampons.

H. Sanitary Napkin Disposal Unit: Stainless steel, semi-recessed, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

1. Product: B-353, manufactured by Bobrick.

2. Product: 4722-10-15 manufactured by Bradley.

I. Hand Dryers: Vitreious enamel cast iron cover and stainless steeldrying chamber recess mounted. Motor: heavy duty, 6200RPM, double insulated, CSA and UL component approved, 115V AC, 60HZ. Fan rotor delivering 150 cfm. Heating Element: 1.25 KW heavy-duty, thermally protected to cut at 90degrees C. Activation by infra-red sensor when hands are placed in drying chamber.

1. Product: Model B-750 manufactured by Bobrick.

J. Coat Hooks: Doors of single occupancy toilet rooms. Stainless steel, bright polished finish, Bobrick B-682, 6-1/4 inch high, projection 3 inches.

1. Mount coat hooks at 48" above finish floor in single occupancy toilet rooms and accessible stalls.

2.05 Commercial Shower and Bath Accessories

A. Shower Curtain Rod: Stainless steel tube, 1 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.

B. Shower Curtain:

1. Product: B-204-2 manufactured by Bobrick; Opaque, matte white vinyl, .008" thick, contains anti-bacterial and flame-retardant agents. Nickel-plated brass grommets along top, one every 6". Bottom and sides to be hemmed

2. Size: 42 x 72 inches, hemmed edges.

3. Shower curtain hooks: B-204-1 manufactured by Bobrick; Type 304 stainless steel for use on 1" and 1 ¼" diameter shower curtain rods.

C. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped, right hand seat.

D. Folding Shower Seat: Comply with ADA Barrier-Free Accessibility Guidelines.Wall-mounted surface; Frame and mounting brackets are type 304 stainless steel with self-locking mechanism. Supports up to 360 lbs when properly installed., L-shaped, right-hand or left hand seat as indicated.

1. Seat: Seat is constructed of durable, water resistant, ivory colored ½" thick solid phenolic. Reverisble for left, or right-hand field installation

2. Product: B-5181 manufactured by Bobrick.

2.06 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Under-Lavatory Pipe and Supply Covers:

1. Insulate exposed drainage piping including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.

2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.

3. Construction: 1/8 inch flexible PVC.

a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.

b. Comply with ASTM C1822, type indicated.

c. Comply with ASME A112.18.9.

d. Comply with ICC A117.1.

e. Microbial and Fungal Resistance: Comply with ASTM G21.

4. Color: White.

5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.

6. Products:

   a. Plumberex Specialty Products, Inc; Plumberex Handy-Shield Maxx: www.plumberex.com/#sle.

2.07 UTILITY ROOM ACCESSORIES

A. Mop Sink Cabinet: Double-door stainless steel cabinet for mop sink and accessories.

1. Double Width Cabinet 300 stainless steel, handing as indicated on Drawings.

2. 16” x 20” x 12” Sink Bowl - (drain included).

3. Opening for mop bucket to roll in.

4. Ventilation Slots.

5. Hinged Double Doors.

6. 4 Fixed Intermediate Shelves (3 in storage side, 1 above sink)

7. 2 Mop Holders (1 on either side - above mop sink)

8. Fabrication:

   a. 16 gauge type “304” Series Sink Bowl

   b. 18 gauge type “304” Series Sink Bowl Apron

   c. All TIG welded.

   d. Welded areas blended to match adjacent surfaces and to a satin fnish.

9. Include the following:

   a. SU-27 Door Lock

   b. K-94-SHELF Fixed Mid-shelf for 84” High Cabinets

   c. Stainless Steel Back Panel

   d. K-472 Add 8” O.C. Faucet Holes for Service Faucet

   e. K-240 Service Faucet

10. Product: Advance Tabco 9-OPC-84D(L or R)-300; www.advancetabco.com.

11. Substitutions: Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation. Conform to referenced standards and applicable codes.

C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

A. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Pertinent section specifying wood or metal blocking for attachment of products.

D. Pertinent sections specifying firestopping and acoustic barriers.

E. Section 09 9123 - Interior Painting: Field paint finish.

1.03 REFERENCE STANDARDS

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.

B. FM (AG) - FM Approval Guide.

C. NFPA 10 - Standard for Portable Fire Extinguishers.

D. UL (DIR) - Online Certifications Directory.

E. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

F. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

G. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, "CAL-Green".

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures

B. Provide complete submittals at the same time as submittals for work in related sections to permit review of complete and integrated systems and assemblies.

C. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, anchorage details, and installation instructions. Demonstrate compliance with specified attributes.

D. CAL-GREEN Submittals: Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

E. Shop Drawings: Indicate cabinet physical dimensions. mounting heights and locations.

F. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

G. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

2.02 MANUFACTURERS

A. Fire Extinguishers:

1. Larsen's Manufacturing Company, Minneapolis, MN, www.larsensmfg.com, is specified.
2. Ansul, a Tyco Business; Cleanguard: www.ansul.com/#sle.
3. J. L. Industries, Inc.; a division of Activar Construction Products Group.
4. Nystrom, Inc: www.nystrom.com/#sle.
5. Potter-Roemer Inc., Cerritos, CA, www.potterroemer.com.
6. Pyro-Chem, a Tyco Business: www.pyrochem.com/#sle.
7. Substitutions: See Section 01 6000 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:

1. Ansul, a Tyco Business: www.ansul.com/#sle.
2. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
3. Nystrom, Inc: www.nystrom.com/#sle.
4. Potter-Roemer: www.potterroemer.com/#sle.
5. Pyro-Chem, a Tyco Business: www.pyrochem.com/#sle.
6. Substitutions: See Section 01 6000 - Product Requirements.

2.03 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.

2. Attach manufacturer's standard metal foil label to cylinder, with printing and graphics indicating information and instructions required by local authorities having jurisdiction. Include current certification tag

B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.

1. Class: A:B:C type.

2. Size and classification as scheduled.

3. Finish: Baked polyester powder coat, red color.

C. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.

1. Class: K type.

2. Size and classification as scheduled.

3. Finish: Polished stainless steel.

4. Temperature range: Minus 20 degrees F to 120 degrees F.

2.04 FIRE EXTINGUISHER CABINETS

A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.

B. Cabinet Construction: Non-fire rated. Provide in non-rated wall construction only.

1. Formed primed steel sheet; 0.036 inch thick base metal.

C. Fire Rated Cabinet Construction: One-hour fire rated. Provide in all one-hour rated wall construction.

1. Steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.

D. Cabinet Configuration: Recessed type. Larsen "Cameo" or equal.

1. Size to accommodate accessories.

2. Trimless type.

E. Cabinet Configuration: Semi-recessed type. Larsen "Cameo" or equal.

1. Size to accommodate accessories.

2. Projected Trim: Returned to wall surface, with 2-1/2 inch projection, and 2-1/2 inch wide face with rolled edge.

3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.

F. Cabinet Configuration: Surface mounted type. Larsen "Cameo" or equal.

1. Size to accommodate accessories.

2. Trim: Flat rolled edge, with 2-1/2 inch wide face.

3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.

G. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinge.

H. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.

I. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

J. Weld, fill, and grind components smooth.

K. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.

L. Finish of Cabinet Interior: White colored enamel.

2.05 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

B. Lettering: “FIRE EXTINGUISHER” decal, or vinyl self-adhering, pre-spaced black lettering in accordance with authorities having jurisdiction (AHJ).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

C. Coordinate sizes and locations of fire protection cabinets with wall depths. At locations where recessed or semi-recessed cabinets will not fit, request Architect approval to provide surface-mounted type.

D. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights below acceptable to authorities having jurisdiction and as required by referenced accessibility regulations.

1. Fire Protection Cabinets: Install cabinets such that the door handle and fire extinguisher

2. handles are no higher than 40 -inches above finish floor.

3. Verify cabinet projection dimensions and mount in accordance with ADA path-of-travel requirements including vertical clearances and control operation heights.

E. In fire-rated walls, coordinate cabinet installation to maintain fire rating of wall.

F. In acoustic-rated walls, coordinate cabinet installation to maintain STC rating of wall.

G. Secure rigidly in place.

H. Place extinguishers in cabinets.

3.03 COORDINATION WITH RELATED WORK

A. Coordinate with pertinent sections for installation of Acoustic Barrier materials outside cabinet assemblies to meet acoustic rating of wall assembly where cabinet is located. Coordinate to ensure Acoustic Barrier materials are concealed inside wall construction.

B. Coordinate with pertinent sections for installation of firestopping materials outside cabinet assemblies to meet fire rating of wall assembly where cabinet is located. Coordinate to ensure firestopping is concealed inside wall construction.

3.04 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturers written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire protection specialties that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection specialties that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.05 SCHEDULES

A. Location: Kitchens and food preparation areas, Type K, 10 lb. capacity.

B. Location: Classrooms and Administrative areas: Type 2A-10-BC, lb. capacity.

END OF SECTION

SECTION 10 5113
METAL LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lockers.

B. Locker benches.

1.02 RELATED REQUIREMENTS

A. Pertinent Sections specifying Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 8113 - Sustainable Design Requirements.

C. Section 03 3000 - Cast-in-Place Concrete: Concrete base construction.

D. Pertinent sections specifying wall framing and blocking for attachment of lockers.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code with California amendments.

D. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, "CAL-Green".

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.

C. CAL-GREEN Submittals: Product Data – VOC Limits: For adhesives sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.

D. Shop Drawings: Indicate locker plan layout in both elevation and section, numbering plan.

1. Indicate field verified dimensions. Draw details of connecting components, fillers, trim, base and accessories, including engineered system of seismic restraint for lockers.

E. Samples: Submit two samples 3 by 3 inches in size showing color and finish of metal locker material.

F. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.

2.02 MANUFACTURERS

A. Metal Lockers:

1. Art Metal Products: www.artmetalproducts.com/#sle.

2. De Bourgh Manufacturing Company, La Junta, CO: debourgh.com.

3. List Industries, Inc: www.listindustries.com/#sle.

4. Substitutions: See Section 01 6000 - Product Requirements.

2.03 DESIGN REQUIREMENTS

A. Structural: Provide structurally engineered system of seismic restraint for lockers to resist over-turning of lockers. Calculations to comply with seismic requirements of C.C.R., Title 24, Part 2, California Building Code.

B. Security: Manufacturer shall design ventilation penetrations and door latching devices (if provided) to prevent unauthorized door operation from locker exterior without a key.

C. Accessibility: Comply with CBC Chapter 11B-222, 11B-803 and ADA Standards..

D. Provide lockers produced by a single manufacturer, including necessary mounting accessories, fittings, and fastenings

2.04 LOCKER APPLICATIONS

A. Athletic Lockers: Metal lockers, free-standing for base indicated on drawings.

1. Configuration: Two tier.

2. Fittings: Size and configuration as indicated on drawings.

a. Upper shelf.

b. Hooks: Two single prong.

3. Ventilation: Perforated side panels and doors.

4. Locking: _____allow for Owner-supplied combination locks

2.05 METAL LOCKERS

A. Accessibility: Comply with CBC Chapter 11B and ADA Standards.

B. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 50/340, with G90/Z275 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.

1. Where ends or sides are exposed, provide flush panel closures.

2. Provide filler strips of minimum 18 gage metal and finished to match locker units, where indicated and where necessary to fill gaps between units, securely attached to lockers.

3. Provide ventilation openings at top and bottom of each locker.

4. Form recess for operating handle and locking device.

5. Finish edges smooth without burrs.

C. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.

1. Body and Shelves: 16 gage, 0.0598 inch.

D. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.

1. Door Frame: 16 gage, 0.0598 inch, minimum.

E. Doors: Hollow double pan, sandwich construction, 1-3/16 inch thick; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth.

1. Door Outer Face: 14 gage, ___ inch, minimum.

2. Door Inner Face: 20 gage, 0.0359 inch, minimum.

3. Form recess for operating handle and locking device.

F. Hinges: Heavy duty, 7-knuckle type; two for doors under 42 inches high; three for doors over 42 inches high. Weld securely to locker body and door.

G. Trim: 20 gage, 0.0359 inch.

H. Coat Hooks: Stainless steel or zinc-plated steel.

I. Number Plates: Provide oval shaped aluminum plates. Form numbers 1 inch high of block font style with ADA designation, in contrasting color.

1. Number lockers in sequence as directed by Owner.

2. Attach plates to each locker door, near top, centered, with at least 2 fasteners of same finish as number plate.

K. Latching: 3/16 x 1-inch steel lever handle, Vandal Proof.

1. Two point minimum latching at all lockers. 3-point, 3-side cremone lever handle latching at wardrobe doors.

2. Fabricate for padlock latching at typical units with hasps for owner supplied combination locks, unless otherwise indicated. ADA key operation (Master Lock model 1636MKADA) at ADA compliant units.

3. Locking device at typical units supplied by Owner.

L. Locks: Locker manufacturer's standard type indicated above.

2.06 LOCKER BENCHES

A. Locker Benches: Stationary type; bench top of laminated birch; painted steel pedestals.

1. Accessibility: Comply with ADA Standards.

2. Dimensions: As indicated on Drawings.

3. Bench Top: Hardwood

a. two coats of clear acrylic finish

B. Locker Bench Support Posts: _____

1. 14 ga steel with 1 5/8" tubing uprighte max 6'on center spacing

2. Load Capacity: 150 per lineal foot pounds. steel post pedestals

3. Finish: Powder coated As selected by architect from manufacturer's available options.

4. Post-to-Floor Attachment: Fasteners/anchors recommended by manufacturer for floor construction conditions encountered.

2.07 ACCESSORIES

A. Each Locker: Provide at all lockers except box-type:

1. Two single prong wall hooks

2. Hat shelf.

B. Fasteners and anchors: Stainless steel, sizes and types to suit substrates and resist imposed loads, as recommended by the Locker Manufacturer.

2.08 FACTORY FINISHES

A. Clean, degrease, and neutralize metal; prime and finish with one coat of baked enamel, all surfaces exposed and concealed, except plates and non-ferrous metal.

B. Color as selected by Architect from manufacturer's standards.

C. Unless otherwise indicated, concealed parts may be manufacturer's standard neutral color.

D. Paint locker units 1 color, as selected.

E. Mens (Boys) and Womens (Girls) lockers shall have separate color selections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions in configurations indicated.

B. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings.

C. Place and secure on prepared base.

D. Install lockers plumb and square.

E. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.

F. Bolt adjoining locker units together to provide rigid installation.

G. Install end panels, filler panels, and sloped tops. Provide flush, hairline joints against adjacent surfaces.

H. Install fittings if not factory installed.

I. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

B. Adjust doors and latches to operate easily without binding.

C. Touch-up marred finishes. Replace units which cannot be restored to factory-finished appearance.

D. D. Protect completed work until Owner's occupancy.

END OF SECTION

OMIT

SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.

B. Wall-hung counters and vanity tops.

1.02 RELATED REQUIREMENTS

A. Section 06 4100 Architectural Wood Casework

1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard.

B. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.

E. NEMA LD 3 - High-Pressure Decorative Laminates.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

F. Sustainable Design Submittal: Documentation for sustainably harvested wood-based components.

G. Installer's qualification statement.

H. Installation Instructions: Manufacturer's installation instructions and recommendations.

I. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.

1. Laminate Sheet, Type ___: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.

a. Finish: Matte or suede, gloss rating of 5 to 20.

2. Back and End Splashes: Same material, same construction.

2.02 ACCESSORIES

A. Fixed Top-Mounted Countertop Support Brackets:

1. Material: Steel.

2. Finish: Manufacturer's standard, factory-applied, textured powder coat.

3. Color: Black.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.

1. Join lengths of tops using best method recommended by manufacturer.

2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.

3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.

1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.

2. Height: 4 inches, unless otherwise indicated.

C. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

C. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 22 0000

PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes furnishing, fabrication, and installation of complete plumbing systems as indicated on the Drawings. Plumbing work includes, but is not necessarily limited to, the following items:
   1. A complete system of soil, waste, vent and sanitary sewer piping and structures, including provisions for mechanical equipment drainage; and connection of same to site existing soil, waste, vent and sanitary sewers, located approximately as indicated on the Drawings.
   2. Cold water distribution system, complete, from points of contact with site domestic water systems (located approximately as indicated on the Drawings) to all plumbing fixtures, mechanical equipment, building specialties, and Owner supplied equipment scheduled for service on the Drawings.
   3. Hot water distribution system, complete, from existing hot water system, located approximately as indicated on the Drawings, to all plumbing fixtures, mechanical equipment, building specialties, and Owner supplied equipment scheduled for service on the Drawings.
   4. Pipe wrapping and insulation.
   5. New plumbing fixtures and trim as scheduled on the Drawings, inclusive of setting of fixtures and connections to drainage and water supply systems.
   6. Flashing of all plumbing pipe penetrations through exterior walls, roofs, and foundations. Sheet metal and lead flashings for pipe penetrations through roofs shall be furnished by the Plumbing Contractor and installed by the appropriate Roofing Contractor.
   7. Excavation and backfill as required for the work of this Section in conformity with Division 31 of the specifications.
   8. Rough in and connection of all fixtures and equipment furnished by the Owner and/or Tenant.
   9. Condensate drainage piping and connections from points of attachment to equipment to indirect waste locations, as noted on the Drawings.
   10. Protection of all piping specified herein and/or shown on the Drawings, from freezing. Buried piping shall be a minimum of 12" below the local frost line. Piping above grade in unconditioned areas shall be insulated.
   11. Testing and adjusting of all piping systems and equipment herein specified.
   12. Sterilization of domestic water systems.

B. All work shall be coordinated with water, gas, sanitary sewer, and other services on the site. The locations of points of connection to the site services shall be confirmed prior to commencement of all work required under this Section.

C. The Contractor shall provide all supervision, labor, materials, transportation, equipment, hauling and services necessary for a complete and operational system, unless otherwise noted. Anything accepted as standard trade practice reasonably incidental to the completion of the plumbing systems, such as offsets, fittings, etc., even though not specifically shown on Drawings or indicated in Specifications, shall be furnished without additional cost to the Owner. The Contractor shall understand that the work herein described shall be complete in every detail, notwithstanding every item necessarily involved is not particularly mentioned, and the Contractor shall be held to provide all labor and material necessary for the entire completion of the work.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Joint Sealants: Section 07 9200

B. Firestopping: Section 07 8400

C. Sheet Metal Flashing and Trim: Section 07 6200.

D. Basic Electrical Requirements: Section 26 0500

E. Basic Electrical Materials and Methods: Section 26 2700.

F. Finish Painting: Section 09 9123

G. Cast in Place Concrete: Section 03 3000

1.03 QUALITY ASSURANCE

A. Regulatory compliance: All work performed under this Section shall comply with the latest currently adopted editions of all codes and regulations and all requirements of all Authorities having Jurisdiction.

B. All work shall be done in conformity with all applicable local and state safety codes, ordinances and regulations. Additionally, all work shall conform to the latest editions of the following codes and standards:
   1. California Mechanical Code
   2. California Plumbing Code
   3. California Building Code
   4. California Fire Code
   5. California Green Building Code
   6. California Electric Code
   7. California Code of Regulations, including Titles 8, 17, 19, 20, 21, 24 and 27
   8. National Fire Protection Association
   9. Comply with all ADA and California Title 24 requirements for disabled access.
   10. NSF/ANSI 61 Standard, *Drinking Water System Components - Health Effects* for fixture materials that will be in contact with potable water.
   11. AB 1953, Amendments to Section 116875 of the Health and Safety Code relating to lead plumbing.

C. Minimum requirements: The requirements of these are the minimum that will be allowed unless such requirements are exceeded by applicable codes or regulations, in which the regulatory codes or regulation requirements shall govern.

D. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the said laws, rules, and/or regulations, accepting that nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations. The Contractor for this work shall furnish any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specifically set forth in the Contract Documents, with no additional charges to Owner.

E. Seismic construction and restraints shall be in accordance with the requirements of the California Building Code and Title 17 and Title 24 of the California Code of Regulations.

F. Comply with the Safety Orders issued by Cal-OSHA and any other regulations of the State of California and any districts having jurisdictional authority.

1.04 SUBMITTALS

A. All submittals shall be submitted under the provisions of Division 01 and the following.
   1. Product Data: for each type of product.
      a. Submit cut sheets for each plumbing fixture. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports and indicate materials and finishes, dimensions, construction details, and flow control rates for each fixture indicated.
      b. Submit manufacturer's product data for all plumbing piping, fittings, materials, and equipment.
   2. Shop Drawings:
      a. Prepare complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Shop drawings shall be prepared using AutoCAD 2014 or newer and shall be drawn at a minimum ¼" = 1' - 0" scale. Sections, details, and diagrams shall be to required scales for specified areas. Include diagrams for all piping, and power, signal and control wiring.
      b. Complete and detailed shop drawings shall be maintained throughout the coordination and construction phase, indicating all equipment and trades' work clearly. All equipment including piping, etc. shall clearly identify both top and bottom elevations as well as distances from equipment to established building lines. Coordinate with other trades and field conditions and show dimensions and details including building construction and access for servicing.
      c. Submit shop drawings to Architect for approval, prior to fabrication or installation of any work. Do not install equipment or piping until layout drawings have been approved. Any work installed without prior shop drawing approval shall be removed at the Contractor's expense.
      d. Use of contract documents for shop drawings is not acceptable.
   3. Welding Procedure
      a. Before any welding is performed, the contractor shall submit to the Architect, copies of any welding procedure specifications and their supporting procedure qualification records for review and acceptance. Copies of welder qualification records shall be made available for review to the owner or his representative at the construction site.
   4. As-Built Drawings
      a. A complete set of Contract Drawings shall be maintained at the work site, and all changes in the work shall be recorded on this set on a daily basis. In addition to changes made during course of work, show the following:
         1) Exact location, type and function of concealed valves and controllers.
         2) Exact size, elevations and location of underground and under floor piping.
      b. Submit to Architect for approval.
   5. Operation & Maintenance Data
      a. Contractor shall provide all operating and maintenance instructions provided by the manufacturer, describing proper operation and maintenance of any equipment and devices installed. Operating and maintenance instructions shall cover maintenance, adjustment, and operation of each piece of apparatus, including preventative maintenance schedule and procedures.
      b. Contractor shall also provide a parts list of all equipment and component parts for all equipment under this Section. The equipment list shall include manufacturer's name, model number, and local representative, service facilities and normal channel of supply for each item.
      c. Also include the following:
         1) Manufacturer's certified shop drawings, and lubrication charts and data. Mark each sheet with equipment identification number and actual installed condition or

system and location of installation. Specifically identify which options are provided.
2) Description of start-up and operating procedures for each system. including controls diagrams and description of operating sequences.
3) Recommend preventative maintenance schedule and procedures.
4) Provide copy of valve schedules for each piping system.
5) Provide copy of equipment label schedule.

B. Submit data to the Architect for approval. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.

1.05 LICENSES, PERMITS, FEES

A. The Contractors for this Division of work shall provide, procure and pay for all licenses, permits, fees, etc. as required to carry on and complete their work.

1.06 ACCURACY OF DATA

A. The data given herein and on the Drawings are as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

1.07 UTILITY CONNECTIONS

A. Provide all services within the building to a point five feet outside of building. Arrange for all utility connections, determine their exact requirements, and pay all costs incurred unless indicated otherwise.

B. Send proper notices, make necessary arrangements, and perform other services required for care and maintenance of all utilities and assume all responsibility concerning same. Observe all rules and regulations of the respective utilities in executing the work.

1.08 DAMAGE BY LEAKS

A. Contractor shall be responsible for any damage to work of other Contractors that is caused by leaks in any temporary or permanent piping systems due to pipe rupture, disconnected pipes or fittings, or by overflow of equipment.

1.09 COORDINATION

A. All work shall be coordinated with water, gas, sanitary sewer, and other services on the site. The locations of points of connection to the site services shall be confirmed prior to commencement of any and all work required under this Section of the Specifications.

B. Coordinate roughing-in and final plumbing fixture locations and verify that fixtures can be installed to comply with original design and referenced standards.

1.10 COOPERATION WITH OTHER TRADES

A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with, or require coordination with the work of this Section, and schedule this work accordingly.

B. Priority of right of way in space shall be as follows, in decreasing order of authority:
1. Electrical lights, electrical panels and drain piping.
2. Ductwork.
3. Fire protection piping, domestic hot water, domestic cold water and condenser water piping.

C. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

1.11 LICENSING REQUIREMENTS

A. All plumbing systems shall be installed by a C-36 Plumbing Contractor. Plumbing systems include: waste removal and connection of on-site waste disposal systems; piping, storage tanks, and venting for supply of gases and liquids for any purpose; all gas appliances, flues, and gas connections; water and gas piping from the owner's side of utility meter to the structure or fixed works; installation of any type of equipment to heat water or fluids to a suitable temperature; and maintenance and replacement of the items described above, including health and safety devices.

1.12 WARRANTIES

A. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.
   1. Provide new materials, equipment, apparatus and labor to repair or replace that determined to be defective or faulty.

PART 2 PRODUCTS

2.01 PRODUCTS CRITERIA

A. All materials, appliances, and equipment shall be new and best of their respective kinds, free from defects, and of the latest design.

B. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

C. All fixtures, materials, and equipment equal in quality and utility to these herein mentioned will be accepted. When specific names are used in describing fixtures, materials, and equipment they are mentioned as standards only, but this implies no right on the part of the Contractor to use other fixtures, materials and equipment, or methods, unless approved as equal in quality and utility by the Architect. The decision of the Architect shall govern as to what fixtures, materials, and equipment are equals to those mentioned, but the burden of proof as to the quality of any proposed fixtures, materials, or equipment shall be upon the Contractor. If any tests are necessary to determine the quality of proposed fixtures, materials, or equipment, an unbiased laboratory shall make such tests at the expense of the Contractor. The chosen laboratory shall be satisfactory to the Architect.

D. Only specified materials shall be utilized in the work of this Section unless substitutions have been approved in accordance with the General Conditions and Division 01 Sections of these Specifications.

2.02 PIPE, FITTINGS

A. General
   1. Tracer wire shall be installed with all non-metallic piping below grade. Tracer wire shall be solid core copper, 14-gauge minimum, lain continuously along pipes. Wire shall be "ty-wrapped" to pipe at eight feet (8' o.c.) on center. Tracer wire shall terminate in concrete access boxes at the beginning and terminal ends of the buried pipe.
   2. All accessible pipe 2" and smaller shall be threaded. Fittings for threaded pipe shall be 150-lb. malleable iron, screwed and banded.
   3. Vent piping shall have vandal resistant mushroom vent caps.
   4. At penetrations through building walls, provide link seal around pipe.

5. Ferrous water piping installed within a building and in or under a concrete floor slab resting on the ground shall be protected by either a protective coating or field wrapping of equivalent protection.

B. Soil, Waste, Drain, Vent Pipe & Fittings
   1. Pipe:
      a. Service weight cast iron, epoxy coated or bituminous coated with NoHub fittings complying with ASTM A74, ASTM A88, and CISPI 301. All pipe and fittings shall be manufactured in the United States and shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute® and listed by NSF® International.
      b. Manufacturers: AB&I, Charlotte, Tyler Pipe, or equal.
   2. Couplings Underground:
      a. Heavy duty Type 304 stainless steel couplings conforming to ASTM C1540 with heavy-duty shield and neoprene sealing sleeve conforming to ASTM C564, CISPI 310, and FM-1680. Minimum four bands for pipes up to 4 inches diameter.
      b. Manufacturers: Mission "HeavyWeight", Anaco Husky "SD-4000", Clamp All (Norma Group) "Hi-Torq 125", Ideal Tridon "HD", Charlotte Heavy Duty "HD", or equal.
   3. Couplings Aboveground:
      a. Minimum 4 bands, Type 304 stainless steel couplings conforming to ASTM C1540 with heavy-duty shield and neoprene sealing sleeve conforming to ASTM C564, CISPI 310, and FM-1680.
      b. Manufacturers: Mission "HeavyWeight", Anaco Husky "SD-2000", Clamp All (Norma Group) "Hi-Torq 80", Ideal Tridon "MD", Charlotte Heavy-Duty "MD", or equal.
   4. Couplings shall be installed in accordance with manufacturer's installation instructions and local code requirements and shall be tightened using a calibrated torque wrench pre-set at 80-inch pounds.

C. If the native soil at the project site is found to be highly corrosive, no steel or cast iron pipe shall be used below grade.
   1. Solid wall PVC Schedule 40 DWV pipe and fittings meeting the requirements of ASTM D 2665, drain, waste and vent. Pipe shall be manufactured from virgin rigid PVC vinyl compounds with a cell class of 12454 as identified in ASTM D 1784. PVC Schedule 40 pipe shall be IPS conforming to ASTM D 1785 and ASTM D 2665. Fabricated PVC DWV fittings shall conform to ASTM F 1866. All pipe and fittings shall be manufactured in the United States. All systems shall utilize a separate waste and vent system. Pipe and fittings shall conform to NSF International Standard 14. Charlotte Pipe or equal
      a. Joints shall be made in a two-step process with primer conforming to ASTM F656 and solvent cement conforming to ASTM D2564.

D. Domestic Hot, Cold, & Tempered Water Pipe and Fittings:
   1. Seamless copper tube:
      a. ASTM B88 or B75, Type L, annealed (soft) temper for 1 ½ inches and smaller
      b. ASTM B88 or B75, Type L, hard temper for 2 inches and larger
      c. Pipe shall be NSF 61 Certified and bear the NSF Certification mark.
      d. Manufacturers: Mueller Streamline, Cerro Flow, or equal.
   2. Fittings
      a. ASME B16.22 wrought copper or cast brass, solder sweat type.
      b. Manufacturers: NIBCO, Mueller, or equal.
   3. Joints:
      a. All above grade piping smaller than 2 inches, 95% Tin/5% Antimony lead free solder
      b. Manufacturers: Oatey, Harris, or equal "95/5"
      c. All above grade piping 2 inches and larger and all below grade piping, regardless of size, shall be brazed with 15% silver/80% copper/5% phosphorous silver alloy braze.

1) Manufacturers: Lucas Milhaupt "Sil-Fos 15" or equal.

d. Press fittings shall also be acceptable:

1) Viega "Copper Press" or NIBCO "Press System" fittings or approved equal. Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed or an alternative supplied by the fitting manufacturer. Press end shall have SC (Smart Connect) feature design (leakage path).

4. Pipes below grade inside buildings shall be soft drawn, Type L or Type K copper tubing, with no joints below slabs. Pipes shall be sleeved with 20-mil plastic sheathing.
5. Trap primer piping below building floor shall be Type K, annealed (soft) copper tubing with no joints below the slab.

E. Condensate drainage and indirect waste piping: Mueller Streamline, Cerro Flow or equal.

1. 1 ¼" and larger shall be type DWV, drawn temper seamless copper tube, ASTM B306 with wrought copper or cast brass fittings. Wrought copper fittings shall comply with ASME B16.29.
2. 1" and smaller shall be type M, drawn temper, seamless copper tube, ASTM B88 with standard pressure fittings.
3. Drainage fittings shall be ASME B16.15 cast brass or ASME B16.29, wrought copper, solder-joint fittings. 1 ¼" & smaller, standard pressure fittings.
4. Insulate condensate drainpipes with minimum ½ inch insulation to prevent moisture dripping from pipe.
5. Acidic condensate drainage pipe and fittings:
   a. Schedule 40, NSF-14, ASTM 439, socket fittings, solvent weld CPVC.

2.03 UNIONS

A. Unions or flanges shall be furnished and installed at each threaded connection to all equipment or valves. The unions shall be located so that the piping can be easily disconnected for removal of the equipment, tank, or valve, and shall be of the type specified in the following:

1. Steel pipe: Class 150, malleable iron, ground joint: Anvil Figure 463, Stockham, or equal. ASME B16.39.
2. Copper pipe: cast copper alloy, soldered joint: NIBCO series 633 or 733, Mueller Streamline, or equal. MSS SP-123
3. Dielectric: lead free, Watts, Jomar, or equal. ASSE 1079

2.04 DIELECTRIC FITTINGS

A. Precision Plumbing Products, "Clear Flow" series, threaded dielectric fittings, sizes 19100P thru 19195P.

B. Dielectric fittings shall have zinc electroplated steel casing, and NSF/FDA listed lining. Fittings shall meet the requirements of ASTM standard F1545 for continuous use at temperatures up to 225°F (- +5°F) and for pressures up to 300 psi, and shall achieve a dielectric waterway in all potable water applications

2.05 VALVES, SPECIALTIES

A. General Requirements:

1. All valves, except pressure reducing and control valves, shall be the same size as the pipe to which they are installed.
2. All valves of a particular type and size range shall be the product of one manufacturer.
3. Valve body materials shall be compatible with piping system materials.
4. Provide a union immediately downstream from each valve, unless the valve is flanged.

5. All valves shall be installed with the stem 45 degrees above horizontal, if possible. In no case shall the stem be installed below horizontal.
6. Where insulation is indicated, install extended stem valves arranged in proper manner to receive insulation.

B. Ball Valves
1. Threaded: NIBCO T-685-80-LF, Watts LFB-6080, or KITZ 858; lead-free, bronze alloy, 2-piece body, full port, blowout proof stem; MSS SP-110; NSF/ANSI-61-8 and NSF/ANSI-372 compliant; 600 PSI non-shock cold working pressure.
2. Solder: NIBCO S-685-80-LF, Watts LFB-6081, or KITZ 859; lead-free, bronze alloy, 2-piece body, full port, blowout proof stem; MSS SP-110; NSF/ANSI-61-8 and NSF/ANSI-372.

C. Gate Valves:
1. 3" and smaller shall be NIBCO T134, Stockham B-120, KITZ 42T; bronze body, union bonnet, rising stem, solid wedge, 150 lb. with wheel handle.

D. Lift Check Valves (vertical): NIBCO T-480-Y-LFor KITZ 836; bronze body, inline lift type, Teflon seat, and discs, spring actuated, 125 lb.

E. Swing Check Valves (horizontal): NIBCO T-413-Y-LF, Stockham B-345, or KITZ 822T; bronze body, Y-pattern swing-type, rated 200 PSI non-shock CWP. Body, bonnet, and disc hanger shall be of lead-free dezincification-resistant material and TFE seat disc. Valve ends shall be threaded type. Valves shall be 3rd party certified to Annex G of NSF/ANSI 61.

F. Butterfly valves: NIBCO LD/WD 2000 series, 200 psi; Valves to be manufactured in accordance with MSS SP-67. Body to have 2" extended neck for insulation and to be shock resistant ductile iron. Valves to have aluminum bronze disc and molded in or cartridge seat of EPDM rubber. Stem shall be 400 series stainless steel. Top and bottom stem bushings of dissimilar material are required with a positive stem retention mechanism. Sizes 2" to 6" shall be lever operated with 10 position throttling plate.

G. Circuit Setters: ITT Bell & Gossett, Circuit Setter Plus series, Model CB, calibrated balance valves with NPT and solder connections. Valves shall be designed to allow installing contractor to pre-set balance points for proportional system balance prior to system start-up. All valves ½" to 3" pipe size to be of bronze body/brass ball construction with glass and carbon filled TFE seat rings. Valves to have differential pressure read-out ports across valve seat area. Read-out ports shall be fitted with internal EPT inserts and check valves. Valve bodies to have 1/4" NPT tapped drain/purge port. Valves shall have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves to have calibrated nameplates to assure specific valve settings. Valves shall be designed for positive shut-off.

H. Thermostatic Mixing Valves: (for lavatories & sinks)
1. Chicago Faucets #122-ABNF, bronze body, adjustment cap with lock, inlet filter wahsers, integral check valve.

I. Flexible connectors:
1. Water Pipe: Flexicraft braided flex connector

J. Water Pressure Regulating Valves: Zurn Wilkins 500XLYSBR series or approved equal. Cast bronze valve body, stem and & plunger; stainless steel fasteners, strainer screen and seat. Meets NSF61. Install where pressure to building exceeds 70 psi.

K. Backflow Preventers (Where shown on the Drawings or required by local code). Provide drain to termination where applicable.
1. Reduced Pressure type:

a. 3/4 to 2": Watts LF909-FS small with 909 series air gap fitting, Zurn 975-XL series, or equal

L. Valve boxes (outdoor): Valve boxes, where shown on Drawings, shall be Oldcastle Infrastructure "Christy" concrete utility and valve boxes or equal. High density reinforced concrete box with non-settling shoulders positioned to maintain grade and facilitate backfilling. Etched polypropylene face anchored in concrete and ultra-violet inhibitor. Contractor shall select boxes depending on size and type needed. Index all covers "GAS" or "WATER" as required for service. Provide extensions of length required for depth of bury

2.06 HOSE BIBBS

A. Provide (1) hose bibb in all toilet rooms equipped with a floor drain. Hose bibb shall be 24" above finished floor, adjacent to or in between lavatories
   1. HB-1 (Interior) Inside Sill Fitting: Chicago No. 293-E27CP, wall mounted, chrome plated inside sill fitting; full flow, inline vacuum breaker with hose thread outlet; tee handle; ½" NPT female thread inlet. Slow compression rebuildable cartridge; slip wall flange. Provide a Chicago No. 1771ABCP loose key stop at each hose bibb.

2.07 FLOOR DRAINS

A. Floor Drains: Drains in membrane dampproofed floors shall have flashing flange and membrane clamp. Drains in sheet vinyl floors shall have a 14" square latex flange.
   1. FD-1: Jay R Smith Figure 2005Y(A)-03-06DIA-AHP-P075, or equal Watts, Mifab, or Sioux Chief. cast iron body with flashing collar, 3" outlet, 6" round nickel bronze adjustable strainer, ¾" trap primer connection, heel proof grate.

2.08 FLOOR SINK

A. Floor Sinks: Where shown on the Drawings, floor sinks shall be as follows: Set rim flush with finished floor.
   1. FS: Zurn Z1901-P-3, or Jay R Smith Figure 3430, floor receptor 12" x 12" x 8" deep, cast-iron body and square light duty ½ grate with ½" slotted openings, white acid resisting porcelain enamel interior and top, complete with ABS anti-splash interior bottom dome strainer and ½" trap primer connection, 3" pipe size. Set rim flush with finished floor.

2.09 TRAP PRIMERS

A. Trap primers shall be installed for all floor drains as follows:
   1. Trap primers shall be Precision Plumbing Products (model P2-500 or PR-500). Trap Primers shall be pressure drop activated and be of all brass construction including a brass body with ½" male NPS inlet and ½" female NPT discharge. Internal components shall consist of a stainless-steel debris screen, brass piston and brass discharge jet. Lubricated O-rings shall be EPDM and seal O-rings shall be nitrile.
   2. Trap primers shall be installed on fresh cold-water lines of 1 ½" diameter or less and shall be located where they will be subjected to frequent pressure drops of at least 10 psi. Install with shut off valve and access doors in Janitor's closets, Mechanical Rooms and other areas not served by, or in close proximity to, flushometer valve operated water closets.
   3. Working pressure shall be 20 to 80 psig.

2.10 CLEANOUTS

A. Cleanouts in membrane dampproofed floors shall have flashing flange and membrane clamps. Plugs shall be bronze, with cast iron body ferrule for cast iron pipe.

B. Floor Cleanouts (FCO): Zurn ZN1400-HD, "Level-trol" adjustable floor cleanouts, dura-coated cast iron with gas and water-tight ABS tapered thread plug, and round scoriated top, adjustable to finished floor.

C. Grade (COTG): Zurn Z1474-N or approved equal Jay R Smith. Housing to be dura-coated cast iron body with integral anchor flange and scoriated cover with lifting device. Cleanouts in un-paved areas shall be set in 18" x 18" x 4" concrete pads.

D. Accessible:
1. Cast iron pipe: Zurn Z-1440, dura-coated with gas and water-tight, bronze, taper thread plug
2. Steel pipe: Zurn Z-1470-A bronze, raised head, cleanout plug.
3. Copper tubing: NIBCO figure 816 or 817.

E. Wall Cleanouts (WCO):
1. Copper tubing: NIBCO figure 816 or 817, with Zurn Z-1462, 6" x 6" polished chrome-plated bronze wall plate and frame.
2. Cast iron pipe: Zurn Z-1441, dura-coated with gas and water-tight bronze, taper thread plug and round smooth stainless steel access cover with securing screw
3. Steel pipe: Zurn Z-1468, round stainless steel wall access cover, complete with securing screw and bronze raised hex head plug for steel pipe.

2.11 SLEEVES, WALL PLATES

A. Service pipe through exterior walls, roofs, interior walls, floors and ceilings: brass escutcheons with chrome plated finish and set screw. Brasscraft, Sioux Chief, or equal

B. Pipes through, under footings: 18-gauge iron sleeves, two diameters larger than pipe, cast in concrete, annular space filled with mastic or plastic bituminous cement.

C. Pipes through floors, interior concrete walls, fire rated walls, and smoke stop partitions: 18-gauge iron sleeves two diameters larger than pipe, annular space filled with 3M "Fire Barrier Sealant CP 25WB+.

D. Pipes through 1-hour walls shall be protected with fire retardant mastic as detailed on the drawings. Installation shall be in full accordance with the requirements of the UL system number. Hilti or approved equal.

2.12 SHOCK ABSORBERS

A. Zurn "Shoktrol" model Z1700 or equal Jay R Smith, water hammer arrestors with stainless steel bellows. Install with gate valve shut-off and access door at all flush valves or other automatic valves. A single unit sized in accordance with the manufacturer's recommendations may serve a battery of valves.

B. Shock absorbers shall be installed at all solenoid, remote operated, or quick closing valves and at each plumbing fixture or battery of plumbing fixtures. Install on both hot and cold-water branch lines, in an upright position, as close as possible to the valve or valves being served.

2.13 ACCESS DOORS

A. Where construction is not inherently accessible, provide adequately sized and conveniently located access doors in ceilings, walls, and furring for access to controls and for servicing valves, equipment, etc.

B. Access doors shall be flush, prime coated steel except for tiled surfaces, and screwdriver operated latch/locks, except for fire-rated. Minimum size shall be 12" x 12". Provide larger sizes where required.

1. Fire Rated walls and ceilings: Milcor style UFR, Karp style KRP, MIFAB style MPFR, or approved equal, U.L. Class B, 1½ hour rated, 20-gauge steel door; 16-gauge steel frame; insulated, self-closing, continuous piano hinge; keyed paddle latch, interior latch release.
2. Drywall ceilings or walls: Milcor style DW, Karp style KDW, MIFAB style MDW, or approved equal, drywall bead; 16-gauge steel frame & door or 16-gauge steel frame & 14-gauge steel door; concealed spring hinge
3. Masonry walls: Milcor style M, Karp style DSC-214M, MIFAB style UA, or approved equal, 16-gauge steel frame & door or 16-gauge steel frame & 14-gauge steel door; spring loaded hinge
4. Tiled walls and ceilings: Milcor style MS, Karp style DSC-214M(S), or approved equal, 16-gauge stainless steel frame & door or 16-gauge stainless steel frame & 14-gauge stainless steel door; satin finish; spring loaded hinge
5. Plastered walls and ceilings: Milcor style K, Karp style DSC-214PL, MIFAB style CAD-FL-Pl, or approved equal, 16-gauge steel frame; 14-gauge steel door; casing bead; concealed spring hinge or continuous piano hinge

C. Doors shall be delivered to the General Contractor for installation.

2.14 THERMOMETERS

A. Weksler “Adjust-Angle”, or equivalent Weiss, with separable sockets and 6" minimum scale reading 30-240°F.

2.15 PRESSURE GAUGES

A. Pressure gauges shall be Marsh “Mastergauges”, Weksler, or approved equal, chrome cast, bronze bushed movement, with white dials and black numerals, 3½” dial with recalibrato

2.16 HANGERS, SUPPORTS

A. All piping shall be supported with Superstrut, B-Line, Anvil, Mifab, or approved equal pipe hangers and supports. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with shield for insulated piping.

B. Hangers and supports shall be designed and manufactured in conformance with ANSI/MSS SP-58. Selection and application shall be in accordance with ANSI/MSS SP-69.

C. All hangers shall be electro-chromate or corrosion resistant finished. Hanger rods shall have electro-galvanized finish.

D. Roof top pipe supports
1. MiFab "C-Port" series or B-Line "Dura-Block" or approved equal.
   a. Model C rubber support series with 14-gauge galvanized channel.
   b. Seismic: Model CZ rubber base with 14-gauge galvanized channel

E. Seismic hanger rod stiffeners: B-Line SC-228, Anvil AS 3500 or approved equal

F. Copper tubing:
1. B-Line 3690, Superstrut C-711 or Anvil Figure 67 "J" pipe hangers or approved equal, complete with isolator.
2. Isolators: B-Line "Vibra Cushion" B1999, Type L & K for copper tubing, Superstrut C-716 isolator for copper, Anvil Figure CT-769 or approved equal

G. Insulated pipe:
1. Hangers: B-Line 3690 "J" pipe hanger, Superstrut C -711 or Anvil Figure 67 fitted to outside of insulation or approved equal
2. Pipe Shields: B-Line 3151 insulation protection shield, Superstrut C-790, or Anvil Figure 167 or approved equal

H. Channel: B-Line B22, Superstrut A 1200, Anvil AS 200 or approved equal.

I. Trapeze hangers: Grouped pipes may be supported by channel bolted to rods.

J. Point of support connectors:
   1. Wood construction:
      a. Stationary pipes: B-Line B3060, Superstrut 540 or Anvil Figure 206 side beam hanger clip or approved equal
      b. Pipes subject to movement: B-Line B-756 or Superstrut S-541 beam clamp swing connector or approved equal
   2. New concrete construction: B-Line B2501 light duty spot inserts or Superstrut 452-TB spot inserts or approved equal.
   3. Existing concrete construction: Phillips "Red-Head" 3-piece concrete anchors or Hilti "Quik-Bolt", drilled-in, concrete anchors.
   4. Steel beams: Superstrut Series 500 beam brackets or equal.
   5. Plywood decks: machine bolts, nuts, and washers.

K. Vertical pipe risers:
   1. Riser clamps: Superstrut C-720 extension riser clamps anchored to construction
      a. Bare cold water pipe: Superstrut C-720P, PVC coated to prevent corrosion.

L. Cable Bracing : Cables shall be pre-stretched galvanized 7x19 strand core aircraft cable, with no limit to their installed length. Cables meet the following specifications: MIL-DTL-83420M with Amendment 2, Type 1 non-jacketed cable.

M. Water Heater Restraint
   1. Water Heater platform:
      a. (Wall mount) Water heaters up to 20 gallons shall be supported by HoldRite "Quick Stand", #30-SWHP-WM, wall mounted equipment platform or equal. Constructed of galvanized steel with watertight corners, welded steel drain body, and a built-in drain pan.
      b. (Floor mount) Quick Stand water heater floor stand 24 x 24 size, model #40-S-24
   2. Water heater strap restraints
      a. Holdrite "Quick Strap" #QS-120 , or equal, up to 120 gallons, QS-50 up to 80 gallons
      b. Expansion tanks shall be restrained with Holdrite "Quick Strap" expansion tank bracket #QS-U.
   3. Water heater drain pan
      a. Holdrite "Quick Pan", aluminum pan with 1" PVC or CPVC drain fitting, rolled edge, neoprene flange gasket. Sizes 20", 22", 24", 26", 28", and 30" diameter.
   4. Expansion tanks shall be restrained with Holdrite "Quick Strap" expansion tank bracket #QS-U.

2.17 VIBRATION AND SOUND CONTROL

A. Make all necessary provisions to prevent the transmission of vibration to the building structure and the passage of noise from the equipment rooms to other rooms. Provisions shall include: vibration isolators for motor driven equipment; flexible pipe connections to motor driven equipment; resilient mounting for piping; sealing off pipe and duct penetrations of walls, floors and ceilings of equipment rooms.

B. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line "Vibra Clamp" and "Vibra Cushion", Super Strut, "Trisolator", or equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.

C. Pipes through studs or joists shall be isolated from structure with properly sized Hubbard "Hold-Rite" suspension clamps or LSP "Acousto-Plumb" system.

2.18 PIPE INSULATION

A. General
1. Products shall not contain asbestos, lead, mercury, or mercury compounds.
2. Water lines installed in conditioned spaces can be installed without insulation.
3. Removable insulation jackets shall be provided on all valves.

B. Insulate all hot water supply piping, all hot water return piping, all tempered water supply piping, all tempered water return piping, all piping above ceilings, all cold water supply lines in unconditioned spaces, and all storm and overflow piping (including the body of the drain) with pre-formed fiberglass pipe insulation complying with ASTM C547, with factory applied all service vapor retarder jacket (ASJ), self-sealing longitudinal closure laps (SSL), and butt strips. Johns Manville "Micro-Lok HP®" or Owens Corning "SSL II with ASJ Max Jacketed Fiberglas®" pipe insulation, Armacell LLC Armaflex, or equal.

C. All insulation shall have composite (insulation, jacket, tape seal, and adhesive used to adhere the jacket to the insulation) Fire and Smoke Hazard ratings as tested under Procedure ASTM E 84, NFPA 255 or UL 723, not exceeding: Flame Spread - 25, Smoke Developed - 50. PVC fitting covers, jacketing and accessories such as adhesives, mastics, cements and cloth for fittings should have the same component ratings.

D. All-Service vapor retarder Jacket (ASJ) shall be constructed of high density, white kraft paper, reinforced with a glass fiber yarn and bonded to aluminum foil with self-sealing longitudinal closure laps (SSL) and butt strips. Adhesives or staples will not be required to seal the jacket and butt strips.

E. Fittings, valves, and flanges shall be insulated with Johns Manville "Zeston 2000" one-piece PVC fitting covers, and "Hi-Lo Temp" insulation inserts or Proto "Lo Smoke".

F. Insulation for all exposed piping and all piping in crawl spaces shall be covered with Zeston or LoSmoke PVC jacketing. PVC jackets shall be 20 mil thick and shall be bonded with Zeston "Perma-Weld" or equal adhesive.

G. All piping exposed to the weather shall be finished with field applied aluminum jacketing, 0.016" thick with a factory-applied moisture retarder/protective liner. Johns Manville, ITW Insulation Systems, or equal. Aluminum jacketing shall be overlapped 2 to 3 inches and held in place with stainless steel bands to form a weather tight system Elbows and tees shall be fitted with matching two-piece aluminum fitting covers. Other fittings in metal-jacketed systems shall be finished with conventional weather-resistant insulating materials with painted aluminum finish.

H. Provide removable covers on pumps, backflow devices, valves greater than 2 inches, flanges, strainers, etc., where periodic maintenance or removal of insulation may be required.

I. All domestic water piping below grade shall be insulated with flexible elastomeric insulation, Armacell "Armaflex", Trymer 2000XP, or equal. Pipes shall be sleeved with 30 mil PVC jacket, with glued joints.

J. Insulation thickness shall conform to 2022 California Plumbing Code,Table L, 503.3.3.

FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)				
			1 and less	1 to <1.5	1.5 to < 4	4 to < 8	8 and larger
			INSULATION THICKNESS REQUIRED (in inches)				
Space heating, Hot Water systems (steam, steam condensate and hot water) and Service Water Heating Systems							
Above 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
251-350	0.29-0.31	200	3.0	4.0	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5

2.19 FIXTURES

A. The quantity and location of fixtures shall be taken from the Architectural and Plumbing drawings. Provide adequate supports and all standard trim normally furnished for fixtures. All enamel shall be acid resisting. Traps, unless otherwise noted shall be 17 gage brass tubing, chrome plated when exposed.

B. Submit catalog cut-sheets on all fixtures.

C. Except as otherwise shown, provide ¼" steel backing plates, 36" wide by 12" high minimum size, secured to a minimum of three studs by welding, or with ¼" x 2½" lag screws for all wall hung fixtures for which no other means of support is specified.

D. Stops and supplies: Provide stops for all fixtures. Unless otherwise specified, stops exposed at lavatories and similar fixtures shall be Chicago #1016ABCP chrome plated, loose key. Concealed stops shall be Chicago #1771ABCP.

E. All plumbing fixtures providing domestic water shall comply with AB 1953, lead free. This includes, but is not limited to, lavatory faucets, sink faucets, shower valves, emergency showers, hose bibbs, and drinking fountains.

F. All fixtures shall be standard white color, except as noted.

G. Accessibility
   1. Plumbing fixtures and accessories provided in a toilet room or bathing room required to comply with CBC Section 11B-213.2 shall comply with CBC Section 11B-213.3.
   2. Accessible plumbing fixtures shall comply with all the requirements in CBC Division 6.
   3. Clearance around accessible water closets and in toilet compartments shall be 60 inches minimum measured perpendicular from the side wall and 56 inches minimum measured perpendicular from the rear wall per CBC Section 11B-604.3.1.
   4. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.
   5. Accessible fixture controls shall comply with CBC Sections 11B-602.3 for drinking fountains, 11b-604.6 for water closets, 11B-604.9.5 for children's water closets, 11B-605.4 for urinals; 11B-606.4 for lavatories and sinks, 11B-607.5 for bathtubs, 11B-608.5 for showers, and 11B-611.3 for washing machines and clothes dryers.
   6. Hand operated metering faucets shall remain open for 10 seconds minimum.

7. Accessible lavatories and sinks shall be mounted with the front of the higher of the rim or counter surface 34" maximum above the finish floor or ground. Depth of lavatories or sinks shall not interfere with knee and toe clearance provided in accordance with CBC Section 11B-306 when a forward approach is required. CBC Sections 11B-606.3 and 11B-606.7.
8. Water supply and drain pipes under accessible lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under accessible lavatories and sinks. CBC Section 11B-606.5.
9. Effective March 1, 2017, all single-user toilet facilities shall be identified as Gender Neutral facilities by a door symbol that complies with CBC Sections 11B-216.8 and 11B-703.2.6. No pictogram, text or braille is required on the symbol. If tactile jamb signage is provided, the signage shall comply with the appropriate technical requirements of CBC Section 11B-703. Examples of appropriate designations are "ALL GENDER RESTROOM", "RESTROOM" or "UNISEX RESTROOM". This image represents the required door symbol. 

H. Fixtures
   1. P-1 WATER CLOSET (ADA)
      a. Fixture: Kohler "Highcliff Ultra #K96057SS"; floor mounted, ADA compliant, anti-microbial finish; vitreous china; top spud; 1.28 gpf
      b. Flush Valve: Sloan "Royal" 111 SFSM-1.28-TMO; battery operated infrared sensor w/flashing LED for user in view and low battery. Install the flush valve lever on the wide side of the ADA water closet enclosure.
      c. Seat: Olsonite #95SSCT, open front less cover; elongated; self-sustaining check hinge;
      d. Carrier: Zurn Z1201 or 1202, no-hub; 500 lb. capacity with auxiliary inlets as required.

   2. P-1A WATER CLOSET
      a. Fixture: Kohler "Kingston Ultra"#K84325-SS; wall mounted, vitreous china; anti-microbial finish, vitreous china, top spud; 1.28 gpf (See Architectural drawings for mounting height)
      b. Flush Valve: Sloan "Royal" 111 SFSM-1.28-TMO; battery operated infrared sensor w/flashing LED for user in view and low battery, vandal resistant stop cap, mechanical override.
      c. Seat: Olsonite #95SSCT, open front less cover; elongated; self-sustaining check hinge
      d. Carrier: Zurn Z1201 or 1202, no-hub; 500 lb. capacity with auxiliary inlets as required.

   3. P-1B WATER CLOSET (ADA)
      a. Fixture: Kohler "Kingston Ultra", #K84325-SS; wall mounted, vitreous china; anti-microbial finish, vitreous china, top spud; 1.28 gpf; (See Architectural drawings for ADA mounting height)
      b. Flush Valve: Sloan "Royal" 111 SFSM-1.28-TMO; battery operated infrared sensor w/flashing LED for user in view and low battery, vandal resistant stop cap, mechanical override.. Install the flush valve lever on the wide side of the ADA water closet enclosure.
      c. Seat: Olsonite #95SSCT, open front less cover; elongated; self-sustaining check hinge;
      d. Carrier: Zurn Z1201 or Z1202, no-hub; 500 lb. capacity with auxiliary inlets as required.

   4. P-2 LAVATORY

a. Fixture: Kohler "Kingston" #K-2005; wall mounted; vitreous china; 4" centers; with overflow See Architectural Drawings for mounting height.
b. Faucet: Chicago Faucets #EVR-A12A-11ABCP, hands-free infrared detection, 4" centers, chrome plated, 0.5 GPM, vandal-proof, pressure compensating, Econo-Flo non-aerating spray outlet, single supply (CW only)
c. Drain: McGuire #155A; heavy cast brass open grid PO plug; 1-1/4" x 6" 17GA seamless brass tailpiece, brass lock nut, heavy rubber basin washer and fiber friction washer.
d. P-Trap: McGuire #8902C; heavy cast brass 1-1/4 x 1-1/2 adjustable trap with cleanout plug and 11-1/2 inch center to end. Furnished with slip nuts, 17 gauge seamless tubular brass wall bend, and steel shallow flange.
e. Carrier: Zurn Z-1231EZ or Jay R Smith Figure 0710

5. P-2A LAVATORY (ADA)
   a. Fixture: Kohler "Kingston" #K-2005; wall mounted; vitreous china; 4" centers; with overflow. See Architectural Drawings for ADA mounting height.
   b. Faucet: Chicago Faucets #EVR-A12A-11ABCP, hands-free infrared detection, 4" centers, chrome plated, 0.5 GPM, vandal-proof, pressure compensating, Econo-Flo non-aerating spray outlet. single supply (CW only)
   c. P-Trap: McGuire PW2150WC prewrapped cast brass p-trap w/cleanout and offset grid drain with insulated covers for ADA compliance or equal
   d. Carrier: Zurn Z-1231EZ or Jay R Smith Figure 0710
6. P-3 – URINAL
   a. Fixture: Kohler "Dexter" #K-5452-ET or equal; wall mounted; vitreous china; 3/4" top spud; anti-splash backwall; 0.125 gpf. See Architectural Drawings for mounting height.
   b. Flush Valve: Sloan 186 SFSM-0.125 battery operated infrared sensor w/flashing LED for user in view and low battery. 0.125 gpf
   c. Carrier: Zurn Z-1222
7. P-3A – URINAL (ADA)
   a. Fixture: Kohler "Dexter" #K-5452-ET or equal; wall mounted; vitreous china; 3/4:" top spud; anti-splash backwall; 0.125 gpf. See Architectural Drawings for ADA mounting height.
   b. Flush Valve: Sloan 186 SFSM-0.125-TMO, battery operated infrared sensor w/flashing LED for user in view and low battery. 0.125 gpf. Install flush valve on wide side of ADA enclosure.
   c. Carrier: Zurn Z-1222
8. P-4 – JANITOR'S SINK
   a. Fixture: Florestone "Model 96"; neo angle; drop front mop receptor; 24" x 24" x 12"; terrazzo; stainless steel cap.
   b. Faucet: Chicago 897-CP; vacuum breaker; pail hook; rough chrome plated; adjustable centers.
9. P-6A - BOTTLE FILLER
   a. Fixture: Elkay LZWSSM bottle filler, wall mounted, filtered, non-refrigerated, sensor activated, visual filter monitor. free, laminar flow, real drain
10. P-7 SHOWER (ADA)
    a. Fixture: Tile shower area. See architectural drawings for mounting heights of valves and heads. Bradley 1C-EF-S15-LBJ
    b. Shower Head: Bradley S15 standard showerhead 1.5 GPM with LBJ lockable ball joint

c. Valve: Bradley Equa Flo pressure balancing valve with integral checkstops; hot temperature limit stop

11. P-7A SHOWER (ADA)
    a. Fixture: Tile shower area. See architectural drawings for mounting heights of valves and heads. ADA compliant. Bradley 1C-EF-A36
    b. Hand Shower: Bradley A36, ADA compliant hand-held shower head with 60" flexible hose, 36" ADA grab bar, and vacuum breaker.
    c. Valve: Bradley Equa Flo pressure balancing valve with integral checkstops; hot temperature limit stop, ADA compliant handle

2.20 ELECTRIC WATER HEATER (TANK TYPE)

A. AO Smith model DRE 80-15 gold series commercial electric water heater as scheduled on the Drawings or approved equal. The heaters shall be listed by Underwriters' Laboratories and approved to the NSF Standard 5 by UL. Tank(s) shall be 80-gallon capacity. Tanks shall be equipped with extruded high-density anode. All internal surfaces of the heater(s) exposed to water shall be glass lined with an alkaline borosilicate composition that has been fused to steel by firing at a temperature range of 1400°F to 1600°F.

B. Electric heating elements shall be low watt density. Each element shall be controlled by an individually mounted thermostat and high temperature cut-off switch. All internal circuits shall be fused.

C. The outer jacket shall be of baked enamel finish and shall be provided with full size control compartment for performance of service and maintenance through hinged front panel and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided. The drain valve shall be located in the front for ease of servicing.

D. The heater tank shall have a 3-year limited warranty as outlined in the written warranty. Manufacturer shall supply ASME-rated temperature and pressure relief valve. Fully illustrated instruction manual to be included. Meets standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IES 90.1.

2.21 ELECTRIC WATER HEATER (TANK TYPE)

A. The water heaters(s) shall be AO Smith "Dura-Power" #DEL-10 as scheduled on the Drawings or approved equal. Heater(s) shall be listed by Underwriters' Laboratories. Models shall meet the standby loss requirements of the U.S. Department of energy and current edition of ASHRAE/IESNA 90.1.

B. Heater(s) shall have 150 psi working pressure and be equipped with extruded high density anode rod. All internal surfaces of the heater(s) exposed to water shall be glasslined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range of 1400°F to 1600°F.

C. Electric heating elements shall be medium watt density with zinc plated copper sheath. Each element shall be controlled by an individually mounted thermostat and high temperature cutoff switch.

D. The outer jacket shall be of backed enamel finish and shall enclose the tank with foam insulation. The drain valve shall be located in the front.ase of servicing.

E. Heater tank shall have a 3-year limited warranty as outlined in the written warranty. Fully illustrated instruction manual to be included.

2.22 EXPANSION TANK

A. Amtrol "Therm-X-trol" series, model ST-12, inline type. Tank shall be constructed of steel and have a urethane topcoat finish. The tanks shall have an antimicrobial polypropylene liner, a heavy-duty Butyl NSF/ANSI 61 diaphragm, a projection welded air valve with "InSight™" indicator cap that changes color to indicate tank service, and a patented "Turbulator™" water circulator. The tank shall have a factory pre-charge of 50 PSIG.

2.23 HOT WATER RETURN RECIRCULATING PUMP

A. Grundfos model UPS 26-99 SFC circulator pump as scheduled on the Drawings or approved equal. The pumps shall be UL Listed. The pumps shall be 3-speed with a stainless steel housing, composite impeller, quick connect terminals, a green LED power indicator light, and removable check valve.

B. Provide with Grundfos aquastat kit.

2.24 PIPE AND EQUIPMENT IDENTIFICATION

A. Pipe labeling shall comply with ANSI/ASME A13.1 2015 "Scheme for the Identification of Piping Systems" and ANSI Z535.1 2017 "Safety Color Code". Graphic Products, Brady, or Seton. All piping shall be identified.

B. Pipe Labels: Preprinted, color-coded, with lettering giving name of the contents (full or abbreviated) and arrows to indicate direction of flow.
   1. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
   2. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
   3. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction(s).
   4. Pre-tensioned Labels: Semi-rigid plastic wrap around pipe marker that extends 360° around the pipe at each marker location. The label shall have a ½" strip of adhesive on the inside to further secure the marker.

C. Pipe Label Sizes (per ANSI A13.1 / ASME A13.1-2015 Standards):
   1. For pipes or covering with outside diameter ¾ to 1¼ inches, minimum length of label: 8 inches, minimum height of letters: ½ inch.
   2. For pipes or covering with outside diameter 1½ to 2⅜ inches, minimum length of label: 8 inches, minimum height of letters: ¾ inch.
   3. For pipes or covering with outside diameter 2 ½ to 7⅞ inches, minimum length of label: 12 inches, minimum height of letters: 1¼ inch.

D. Pipe Label Color Schedule: (per ANSI A13.1 / ASME A13.1-2015 Standards)
   a. Potable, Cooling, Boiler Feed and other Water Piping:
      1) Background Color: Green.
      2) Letter Color: White.
   b. Fire Quenching Fluids:
      1) Background Color: Red.
      2) Letter Color: White.
   c. Toxic and Corrosive Fluids
      1) Background Color: Orange.
      2) Letter Color: Black
   d. Flammable and Oxidizing Fluids:
      1) Background Color: Yellow.
      2) Letter Color: Black.
   e. Combustible Fluids:

1) Background Color: Brown.
2) Letter Color: White

f. Compressed Air:
1) Background Color: Blue.
2) Letter Color: White.

E. Valve Tags:
1. For identification and Owner's maintenance records, all valves shall be numbered and identified with brass tags stamped with service abbreviation and sequential number, and pre-drilled holes for attachment hardware, in accordance with Drawings and service performed. Control valves shall be also marked whether normally open (N.O.) or normally closed (N.S.).
2. Minimum size letters: ¼-inch; numbers ½-inch. Minimum tag size: 1 ½-inch diameter.
3. Fasteners: Attach to stem or body of valve so that tag is visible but doesn't interfere with the valve operation. Use Brass wire-link chain or beaded chain.

F. A printed schedule of all valve tags used with identification shall be framed and posted in mechanical rooms, at locations as directed. Include a copy of the schedule in Operations and Maintenance data.

G. Warning Signs: Comply with the requirements of CCR Title 8, Section 3320 (Provide warning signs on machines that are driven by fully automatic starters that may cause injury). Sign shall include caution and warning information plus emergency notification instructions.

PART 3EXECUTION

3.01 SITE CONDITIONS

A. Contractor shall be held to have examined the site and compared it with the Contract Documents, and to have satisfied himself as to the conditions under which the work is to be performed. In the event of discrepancy, the contractor shall notify the Architect and proceed as directed. The Contractor shall be held responsible for all existing conditions, whether or not accurately described, and no allowance shall subsequently be made on his behalf for any error, omission, or extra expense to which he may be put due to failure or neglect on his part to make such examination and notification.

B. Prior to commencing the work of this Section, this Contractor shall inspect the installed work of other trades and verify that their work is sufficiently complete to permit the start of work under this Section and that the completed work will be in complete accordance with the original design. In the event of discrepancy immediately notify the Architect and proceed as he directs.

3.02 ACCESSIBILITY

A. Equipment shall be placed, and piping connections made in such a manner that all routine adjustments and maintenance operations may be carried out without inconvenience and so that all code requirements for clearances are maintained.

3.03 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall be responsible for delivery, storage, protection and placing of all equipment and materials.

B. Contractor shall protect the work and materials from damage during construction. Equipment stored at the jobsite shall be protected from dust, water or other damage, and be covered if equipment is exposed to weather. Protect interiors of new equipment and piping systems

against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

1. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.

C. Cleanliness of Piping and Equipment Systems:
   1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.
   2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.
   3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

3.04 INSTALLATION, GENERAL

A. Apply and install all items in accordance with the manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Architect for resolution.

B. Provide all necessary cutting in connection with the work of this Section. No structural members shall be drilled, bored, or notched in a manner that will impair their structural capacity.

C. Cutting or boring of joists or other structural members shall be done only when alternative routing is impossible and only upon written approval of the Architect or Owner.

D. All penetrations of concrete or masonry shall be made with core drills. No cutting shall be done without the approval of the Architect.

3.05 PAINTING

A. Properly prepare work under this Section to be painted.

B. Painting shall be applied under the Painting section requirements, except preservative and special painting as described herein.

C. Priming as required herein, shall conform to the Painting section requirements and be of a material compatible with paint for finish painting.

D. All equipment and materials shall be cleaned of grease, wax, oil, rust or dirt in preparation for finish painting. Any prime coated surfaces showing signs of rust before being finish painted shall be thoroughly cleaned and a new prime coat applied.

E. Prime paint both sides of flashings prior to installation.

F. Paint all piping in mechanical rooms. Color as selected by the Architect.

G. Black steel piping exposed to the environment shall be painted with rust-inhibiting paint. Color as selected by Architect.

3.06 IDENTIFICATION OF SYSTEMS

A. Pipe Markers
   1. Identify all piping on this project, except piping located within walls or inaccessible areas.
   2. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces, machine rooms, and accessible maintenance spaces such as shafts, tunnels, and plenums and at exterior exposed locations, as follows:
      a. Adjacent to all valves and flanges;
      b. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch;
      c. Before and after all wall, floor and ceiling penetrations and inaccessible enclosures;

d. Adjacent to changes in direction;
e. At access doors, manholes, and similar access points that permit view of concealed piping;
f. Near major equipment items and other points of origination and termination;
g. On piping above removable acoustical ceilings, omit intermediately spaced labels.
h. Install pipe markers on long straight runs every 20 feet. Reduce intervals in areas of congested piping and equipment.
i. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Valve Tags
1. Identify all valves on this project, except drain lines. Attach tags so that they are easily visible but do not obstruct the operation of the valve
2. For identification and Owner's maintenance records, all valves shall be numbered and identified with clearly stamped 1¼" diameter brass tags, in accordance with drawings and service performed.

C. Valve Schedule: For each piping system, on 8 ½" x 11" bond paper, tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), and normal-operating position (open, closed, or modulating). The schedule shall be, shall be framed and posted in mechanical rooms and a copy provided in the maintenance manual.
1. Control valves shall be also marked whether normally open (N.O.) or normally closed (N.S.).

D. Warning signs shall be placed on machines driven by electrical motors that are controlled by fully automatic starters, per California Code of Regulations, Title 8, Subchapter 7 - General Industry Safety Orders, Article 7, Section 3320. .

E. Equipment Label Schedule: For each item of equipment to be labeled, on 8 ½" x 11" bond paper, tabulate equipment identification number as noted on Drawings, identify where equipment is located, and indicate usage. Include a copy of the schedule in Operations and Maintenance data.

F. Underground Tape:
1. Identify all underground piping on this project. Provide a continuous length of detectable tape 12" below the finished earth surface directly above the buried pipe. Provide a second continuous length of tape 12" above the top of the buried pipe if the top of the pipe is lower than 36" from the top of the finished earth surface.
2. If tape cannot be continuous then it must overlap by 10 feet at any end.
3. If piping is buried more than 36" below the finished earth surface, then 2 continuous lengths of tape must be buried as described.

3.07 SEISMIC FORCE RESISTANCE

A. Equipment:
1. Each piece of equipment installed under this Section shall be constructed and anchored to structural supports to resist a seismic force of 150% of the equipment's operating weight in any direction. Supports, anchors, and braces shown shall be minimum.
2. Equipment manufacturer shall design, construct, and certify that his equipment satisfies the special minimum seismic resistance requirements and shall submit calculations or test results supporting his certification.

B. Cable Bracing
1. Cables shall be installed slightly slack, so as not to support gravity loads.
2. Cable shall connect the braced item to a building structural element. Cable shall have a bracket at each end to make the connections. The cable assembly, with connection brackets, shall be Mason Ind. N.Y. SCB or SCBH. Cable is held to end brackets with one or two bolts.

Cable bolts shall be tightened to the torque values stated in the details or, in the case where break off nuts are provided, until the nut breaks off. Break off nuts are as manufactured by Mason West, Inc.

3. The Mason Ind. N.Y. SCBH component can be used for connection directly to the threaded vertical hanger rod used for supporting system gravity loads as detailed in Section D of OPM-0043-13.
4. The SCB bracket and cable (Ref. X1.0), SCBH bracket and cable (Ref. X1.1), and UCC rod stiffener clamp (Ref. X3.0) are manufactured by Mason Ind. N.Y. and are included (with accompanying hardware) in the kit options provided in Section D. of OPM-0043-13

C. Piping:
1. Flexibility of piping systems must be maintained by using flexible devices at critical points at junctions of separate building structures. Braces or anchors shall be designed to damp oscillations or check excessive movement. Flexible devices for piping of gas shall be loops or offsets. Flexible devices for other piping may be loops, Victaulic grooved, or roustabout couplings.
2. Piping at tops and bottoms of risers are critical points where flexibility is required, as well as at changes in direction on long runs of piping 4" and larger. Tops of risers shall be restrained from motion in horizontal direction, and midpoints shall be anchored in all directions.
3. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPM number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
4. Install lateral bracing with pipe hangers and supports to prevent swaying.

3.08 INSTALLATION, HANGERS AND SUPPORTS

A. Pipe supports shall be spaced according to CPC 2022, Table 313.3 and sufficiently close to support pipes properly without formation of pockets. Hangers shall be installed at ends of mains and branches.

B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

C. Install lateral bracing with pipe hangers and supports to prevent swaying.

D. Provide resilient mounting for domestic water piping. Thermal insulation may serve as resilient mounting for insulated piping.

E. Suspended water piping shall be anchored with steel struts installed at midpoint of each run.

F. No valve or piece of equipment shall be used to support piping.

G. Install lateral bracing with pipe hangers and supports to prevent swaying. The following table shows maximum lengths of shapes used for sway bracing:

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves and flanges, 2-½ inches and larger and at

changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Installation of piping shall be such that damage cannot result through loading, expansion or contraction of piping. Anchors shall be installed to obtain uniformity of pipe movement.

K. Hanger rod sizes shall be no smaller than 3/8-inch for pipe and tube sizes ½ to 4 inches and ½ inch for sizes 5 - 8 inches.

L. Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of thickness equal to the adjoining insulation. Inserts shall not be less than 10" long for pipe sizes up to 2 ½" and not less than 12" long for pipes larger than 2 ½".

M. Metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts.

3.09 INSULATION

A. General
1. Insulation shall be applied in complete accordance with the manufacturer's published installation instructions.
2. All insulation shall be applied on clean, dry surfaces and shall be continuous through wall and ceiling openings and sleeves except where fire stop materials are required.
3. All joints shall be firmly butted together and longitudinal jacket laps and butt strips shall be smoothly secured.
4. Adhesives, mastics, and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon.
5. Install insulation with least number of joints practical.
6. All pipe insulation ends shall be tapered and sealed, regardless of service.
7. All surface finishes are to be extended to protect all surfaces, ends and raw edges of insulation.

B. Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of thickness equal to the adjoining insulation. Inserts shall not be less than 10" long for pipe sizes through 2½" and not less than 12" long for pipes larger than 2½".

C. Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid closed cell pipe insulation of thickness equal to the adjoining insulation. Inserts shall not be less than 12" long for pipe sizes through 2½" and not less than 18" long for pipes larger than 2 ½". Refer to manufacturer’s recommendations for densities, sectional length, gauge of metal shield and distance between centering.

D. Metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and the length specified for hanger inserts.

E. Aluminum jacketing shall be overlapped 2 to 3 inches and held in place with stainless steel bands to form a weather tight system.

F. Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc. that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation. Seal all pipe terminations with vapor barrier mastic.

G. Insulation thickness shall conform to 2022 California Energy Code, Table 120.3-ATitle 24, Part 6 requirements as indicated in the following table, except piping that penetrates framing members, which shall not be required to have pipe insulation for the distance of the framing

penetration. Metal piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing.

H. PIPE INSULATION THICKNESS

I.

3.10 PIPE WELDING

Fluid Operating Temperature Range (°F)	Insulation Conductivity			Nominal Pipe Diameter (in inches)		
	Conductivity (in Btu-inch per hour per sq.ft. per °F)	Mean Temperature (°F)		<1	1 to <1.5	1.5 to <4
Service Water Heating Systems				Minimum Pipe Insulation Required (Thickness in inches or R-value)		
141-200	0.25-0.29	125	Inches	1.5	1.5	2.0
			R-value	R 11.5	R 11	R 14
105-140	0.22-0.28	100	Inches	1.0	1.5	1.5
			R-Value	R 7.7	R 12.5	R 11

A. All hot water piping shall be installed, examined, inspected and tested in accordance with the requirements of ASME B31.9, Building Services Piping, current edition.

B. Weld all pipe 2.5 inches and larger. Use the following procedure. All welders must be AWS certified. AWS B2.1 SMAW 6G Pipe Welding Procedure Specifications

Welding process: SMAW	Grove Angle: 60 degrees
Position: 6G Fixed position	Material/Spec: A 106
Weld Progression: Up	Thickness (pipe/tube): Groove (in) .280
Backing: No	Notes: Sch. 40 Pipe
Current/Polarity: DCEP	Filler Metal Class: E6010Rt/E7018F1
Root Opening: 1/16 to 1/8	Other Filler Metal Class: Rt. 1/8, 3/32 Filler

C. Welded joints shall be beveled and butt-welded. Reductions of pipe shall be made with forged steel welding fittings. Branch reductions of two or more pipe sizes smaller than the main, may be Bonney "Weld-O-Let" fittings, or equal. Job fabricated reductions and branches shall not be used. All pipe burrs shall be reamed out. Welding rods shall be as follows, or approved equal:

Pipe Size	Arc Welding	Gas Welding
2" and larger	Fleetweld #5	Oxweld #1 or Page Hi-Test M
1½" and smaller	None	Oxweld #1 or Page Hi-Test M

3.11 FIXTURES

A. Seal joints between plumbing fixtures, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Division 07 Section "Joint Sealants.

3.12 INSTALLATION, PIPING

A. General

1. Rough in shall proceed as rapidly as general construction will permit. All rough-in shall be complete, at locations verified by Architect and Owner, and tested and inspected prior to installation of concrete, lath, plaster, gypsum wallboard, or other finishes.
2. All piping shall be concealed in finished rooms, installed in furred walls and partitions. Where furred or suspended ceilings occur, piping shall be installed in the concealed space at points adjacent to beams and/or other structural members and coordinated with ductwork and equipment. Where exposed piping occurs, it shall be installed parallel to or at right angles to building walls, unless specifically shown otherwise on the Drawings.
3. Installation of piping shall be such that damage cannot result, through thermal expansion or contraction, to piping, building, or pipe hangers and supports. Anchors shall be installed at midpoints of all runs in main piping for the purpose of localizing pipe expansion or prevention of creepage.
4. All pipe lines shall be installed free from traps and air pockets, true to line and grade, with suitable supports properly spaced. All piping shall be installed without undue stresses and with provision for expansion and contraction.
5. All piping shall be new and free from foreign substances. American standard pipe threads shall be used for IPS threaded work. Joints in threaded piping shall be made up with Teflon tape applied to the male threads only. No screwed pipe joints shall be caulked or packed with rope or other packing materials. Pipe shall be free from tool marks, threads cut accurately with not more than two (2) threads showing beyond fitting. Friction wrenches shall not be used with plated, polished, or soft metal piping. All changes in pipe size shall be made with reducing fitting. Bushings will not be permitted.
6. Protect unattended openings in piping during construction.
7. All copper tubing shall be formed in a workmanlike manner, in accordance with the Pipe and Tube Bending Handbook of the Copper and Brass Research Association. A tube bender giving support to the periphery of the tube shall be used. The tubing shall be protected against flatting or other injury.
8. All copper connections and joints shall be made in accordance with the Copper Tube Handbook, Copper and Brass Research Association. No swaged connections will be permitted. All valves, pumps, and similar equipment shall be connected to copper piping through union or flange adapter fittings.
9. No water or drainage piping shall pass over electrical equipment unless adequate protection is provided to prevent damage by leaks or condensation.
10. Install air vents at all water piping high points when direction of flow is downward.
11. Install sediment drain faucets at all low points.
12. Valves, cocks, etc., shall be installed to allow convenient accessibility and operation.
13. Unions and flanges shall be installed to allow convenient replacement of all equipment and cleaning tubes.
14. A union connection shall be installed downstream from all valves, at equipment connections and at other locations as required or directed.
15. Shut off valves shall be provided in all main services, and where required to permit proper servicing of equipment. Valves of one type shall be of one manufacturer.
16. All valves shall be of the same size as the pipelines in which they are installed, unless specifically sized on the Drawings. All hand-controlled line valves shall be ball valves, except where throttling control or frequent operation is required, in which case globe or angle valves shall be used. Globe valves in horizontal lines shall be installed with stem in horizontal to permit line draining. All globe and angle valves shall be installed to close against pressure. Disc valves shall have discs suitable for the services for which they are to be used.
17. All valves shall be accessible and shall not be installed with the stems below the horizontal plane. Provide access panels at walls, ceilings, or floors.

18. Provide prime coated escutcheon plates at all points where exposed piping penetrates finished wall ceilings or floors.
19. No water or drainage piping shall pass over electrical equipment unless adequate protection is provided to prevent damage by leaks or condensation.
20. Protect unattended openings in piping during construction.

B. Waste, Vent, Drain Piping:
1. Soil, waste, and vent piping occurring within the building shall be installed to a uniform minimum grade of ¼" per foot unless otherwise noted. Vent piping shall be graded so that all condensation shall flow directly to a soil or waste line.
2. Changes in direction of drainage piping shall be accomplished by using appropriate drainage and sanitary fittings.
3. Drilling and tapping of drains, soil, waste, or vent pipes and the use of saddle hubs and bands are prohibited.
4. Protection against breakage of piping passing under or through walls shall be provided using sleeves and caulking.
5. Adapters shall be installed between threaded iron and soil pipe.
6. Test tees shall be installed at the foot of all soil, waste, and storm water stacks.
7. Cleanouts shall be located where indicated on the Drawings, at all horizontal offsets, at ends of waste or sewer branches more than 5' in length, at intervals of 100 feet in straight runs of piping or at closer intervals if directed or required by local code. Location of cleanouts in finished spaces shall be approved by the Architect prior to installation.

C. Hot, Cold Water Systems:
1. Di-electric unions shall be installed where copper pipe is connected to galvanized steel piping or stub outs.
2. Connections from copper pipe to fixture supply fittings shall be made with copper or brass nipples.
3. Provide 18" high vertical air chambers, of size equal to "local connection schedule" size, at all domestic water connections to fixtures and/or equipment that are not specified to have shock absorbers.
4. All domestic water piping shall be kept clear of the building structure. Where it is within 1" of the building structure it shall be wrapped with felt (3/16" minimum thickness).
5. To the greatest extent possible, domestic cold-water piping shall be kept separated from hot piping and where there is a choice shall be run in the coolest portion of the available space.

D. Natural Gas Piping Systems:
1. Natural gas piping shall slope back to meter where possible; bottom of vertical natural gas lines shall be fitted with 6" long capped drip legs.
2. In addition to main shut-off valve, a natural gas stopcock shall be installed at each natural gas fired piece of equipment.

E. Indirect Waste Piping:
1. Indirect waste piping shall be installed to a uniform minimum grade of ¼" per foot unless otherwise noted.
2. Changes in direction of indirect waste piping shall be accomplished by using the appropriate drainage fittings.
3. Drilling and tapping of indirect waste pipes and the use of saddle hubs and bands are prohibited.
4. Protection against breakage of piping passing under or through walls shall be provided using appropriate sleeves and caulking.

F. Plumbing Fixtures:

1. Space between wall mounted fixtures and wall surface shall be neatly pointed up with silicone rubber compound of color matching fixture.
2. All exposed bolt heads and nuts used to secure fixtures shall be concealed with vitreous china caps.

G. Flashing:
1. All roof and wall penetrations shall be flashed and counterflashed water-tight with 26 gauge sheet metal, except as noted.

H. Excavation, Backfill:
1. Provide all excavation, trenching, and backfill in connection with the work of this Section.
2. Excavation shall be carried to 4" below the bottom of pipes. Provide a sand bedding for all sloped drainage piping and provide smooth uniformly graded bedding of firm but yielding material for all other piping, catch basins, and similar structures.
3. Backfill material shall be non-corrosive and free from all foreign material that could damage pipes. Installation shall be in accordance with "Division 31 - Earthwork

3.13 TESTING, INSPECTIONS

A. Contractor shall not allow or cause any work of this Section to be covered or enclosed until it has been inspected, tested, and approved by the Architect and the authorities having jurisdiction over the Work. Should any of this work be enclosed or covered up before such inspection, testing, and approval, this Contractor shall uncover the work, have the necessary inspections, tests, and approvals made and, at no expense to the Owner, make all repairs necessary to restore both his work and that of other contractors which may have been damaged to be in conformity with the Contract Documents.

B. Contractor shall make all tests required by all local, state, and federal laws, codes, ordinances, and regulations having jurisdiction over this work. Furnish all necessary labor, materials, and equipment for conducting tests, and pay all expenses in connection therewith. Should leaks develop while testing, repairs shall be made, and tests shall be repeated until a satisfactory test result is obtained.

C. Furnish all necessary labor, materials, and equipment for conducting tests, and pay all expenses in connection therewith. Should leaks develop while testing, repairs shall be made, and tests shall be repeated until a satisfactory test is obtained.

D. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended or repaired.
1. Hot and Cold-Water Piping: Shall be hydrostatically tested for 6 hours at 150 psi. All equipment shall be tested water tight at utility pressure.
2. Drainage and Vent Piping: Shall be tested for 1 hour by expelling air from the system, plugging all outlets, and filling the pipes with water to the top of vertical sections of pipes. No loss of water shall be permitted. If leaks are found, check for proper torque.
3. Condenser water piping shall be hydrostatically tested at 125-psi pressure and proved tight before covering. Tests may be made in sections provided connection to service previously tested is included in each succeeding test. Systems shall be tight for eight hours.
4. Natural Gas Piping: Shall be tested for 24 hours at a pressure of 50 psig with nitrogen or compressed air. No pressure drop shall be allowed during the last 4 hours of the test. Tests joints of natural gas piping with Leak-Tec or Nupro-Snoop solution while maintaining 10 psig minimum internal pressure.

3.14 DOMESTIC WATER SYSTEM STERILIZATION

A. Upon completion of this work, the new domestic water system shall be thoroughly flushed, sterilized and re-flushed. Sterilization and re-flushing shall be performed using the procedure below. All work shall be performed in the presence of the inspector.

B. All domestic water outlets shall have signs posted at their location stating that the water has not been sterilized and shall not be used for human consumption. The signs shall remain until the sterilization process is complete.

C. Procedure
   1. Introduce chlorine or a solution of sodium hypochlorite, filling the lines slowly and supplying the sterilization agent at a rate of 200 parts of chlorine per million. The entire system shall be completely filled with the solution. All valves shall be operated and ends of all branches tested for residual chlorine. Continue to inject the solution until at least 200 ppm of free chlorine is indicated.
   2. After the sterilizing agent has been applied, the system shall be isolated with the solution retained for at least 3 hours. Test for residual chlorine after retention. If less than 200 ppm is indicated, repeat the sterilization procedure.
   3. After satisfactory sterilization, flush the system until all traces of the chemical are removed or until the chlorine content is no greater than that in the existing supply.

D. After a period of 48 hours minimum, bacteriological tests, using samples from at least 3 representative points, shall be made by recognized testing agency, who shall certify to the Architect that the system is bacteriologically safe and at least equal in safety to that of the principal water supply. The laboratory report and certification shall be transmitted to the Architect.

3.15 CLEANING OF PIPING

A. Flush all water piping systems. Remove, clean and replace all strainer baskets prior to final inspection.

3.16 ADJUSTING

A. Properly adjust all stops, and controls, and demonstrate safe and satisfactory operation of all equipment.

3.17 CLEANUP

A. Upon completion of the work of this Section, remove all surplus material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION

SECTION 23 0000

HEATING, VENTILATING, AIR CONDITIONING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes furnishing and installation of complete "Heating, Ventilating, Air Conditioning" systems, including but not necessarily limited to the following:
   1. Split system heat pump air conditioning units
   2. Refrigerant piping and appurtenances
   3. Roof mounted exhaust fans
   4. Air terminals
   5. Thermal and sound insulation for all piping and ductwork supplied under this Section.
   6. Flashings, curbs, and caps in connection with all equipment, piping and ductwork supplied under this Section.
   7. Ductwork, inclusive of all air turns, dampers, grilles, diffusers, fire dampers, sound traps, supports, bracing and fresh air/combustion air ducts
   8. Temperature control wiring and control devices
   9. Equipment startup, adjusting, and balancing.

B. Related Work
   1. Sheet Metal Flashing and Trim, Joint Sealants - Division 07
   2. Finish painting – Division 09
   3. Section 23 0500 - General Mechanical
   4. Section 23 0593 - Testing, Adjusting and Balancing for HVAC
   5. Section 23 0900 – Controls for HVAC
   6. Division 26 for basic electrical requirements and line voltage wiring, disconnect switches, conduit for temperature control wiring, etc.

C. The Contractor shall furnish all materials and labor under the scope of the Contract, unless otherwise noted. Anything accepted as standard trade practice reasonably incidental to the completion of the system shall be furnished without additional cost to the Owner. The Contractor shall understand that the work herein described shall be complete in every detail, notwithstanding every item necessarily involved is not particularly mentioned, and the Contractor shall be held to provide all labor and material necessary for the entire completion of the work.

D. ASHRAE Compliance
   1. Comply with applicable requirements in ASHRAE 62.1 and ASHRAE 90.1

1.02 SUBMITTALS

A. All submittals shall be in accordance with the requirements of the General Conditions and Division 01.

B. General
   1. Before any fixtures, materials, or equipment are purchased, the Contractor shall submit to the Architect for approval, a complete list of materials, fixtures, and equipment, giving the manufacturers' names, capacity, size, power requirements, and other pertinent data. Submittal lists and drawings shall be specifically applicable to this project and shall include identifying marks assigned by the Drawings. Extraneous material or optional choices shall not be included.

2. Submittal of substitutions shall be limited to one (1) proposal for each type or kind of item, unless otherwise permitted by the Architect. If the first proposed product submittal is rejected, the Contractor shall then submit the first named or scheduled product.
3. The Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements. Review of drawings and other material submitted shall not be construed as a complete check or constitute a waiver of the requirements of the Drawings and Specifications but will indicate that the material submitted is acceptable in quality and utility. This review shall not relieve the Contractor of the responsibility to fit the proposed materials to the spaces provided, and to effect necessary rearrangement or construction of other work.
4. The Contractor shall submit for the approval of the Architect shop drawings of proposed material and equipment that differ from the specified materials and equipment and of any specified materials and equipment with special conditions and/or arrangements. These drawings show necessary modifications of Owner, plumbing, electrical and mechanical work required by the proposed materials and equipment.

C. Product Data
1. For all HVAC equipment and each type of product indicated, include manufacturer's specifications and data sheets, and certified drawings on major equipment. Include physical and performance data, such as weights, sizes, capacities, required clearances, performance curves, acoustical characteristics, finishes, color selection, and accessories.
2. Include certified drawings on major equipment.

D. Coordinated Layout/Shop Drawings
1. Prepare complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Shop drawings shall be prepared using AutoCAD 2014 or newer and shall be drawn at a minimum ¼" = 1' - 0" scale.
2. All drawings shall be fully coordinated with HVAC, Plumbing, Fire Protection, Electrical, Structural, and Architectural work. Drawings shall be coordinated and dimensioned indicating equipment, pipe, duct, fire protection, and electrical in relation to architectural and structural features. Indicate exact locations of valves, piping specialties, access doors, etc.
3. Clearly identify and dimension the proposed locations of the principal items of equipment and adequate clearance for all equipment, piping, pumps, valves, and other items. Provide detailed layout of all piping systems showing the proposed routes.
4. Show the access means for all items requiring access for operations and maintenance.
5. Submit shop drawings to Architect for approval, prior to fabrication or installation of any work. Do not install equipment or piping until drawings have been approved. Any work installed without prior shop drawing approval shall be removed at the Contractor's expense.
6. The use of contract documents for shop drawings is not acceptable.
7. Any work installed without prior shop drawing approval shall be removed at the Contractors expense.

E. Submit shop-wiring diagrams of temperature controls and air conditioning unit controls for approval. Furnish approved wiring diagrams and assistance to electrician.

F. Equipment manufacturer shall design, construct, and certify that his equipment satisfies the special minimum seismic resistance requirements for this project and shall submit calculations or test results supporting his certification.

G. Field quality-control test reports.

H. Operation and Maintenance Data

1. The Contractor shall provide all operating and maintenance instructions provided by the manufacturer, describing proper operation and maintenance of any equipment and devices installed. Operating and maintenance instructions shall cover maintenance, adjustment, and operation of each piece of apparatus.
2. The Contractor shall also provide a parts list of all equipment and component parts for all equipment under this Section. The equipment list shall include the manufacturer's name, model number, and local representative, service facilities and normal channel of supply for each item.
3. Data shall include a table of contents identifying items therein, and index tabs for each system. Neatly obscure or cross out inapplicable data from manufacturer's literature. Include the following:
    a. Manufacturer's brochures, ratings, certified shop drawings, lubrication charts and data, and parts list with part numbers. Mark each sheet with equipment identification number and actual installed condition or system and location of installation. Specifically identify which options are provided.
    b. Description of start-up and operating procedures for each system, including controls diagrams and description of operating sequences.
    c. Recommend preventative maintenance schedule and procedures.
4. Submit data to the Architect for approval. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.

I. As-built Drawings
1. Complete and detailed shop drawings shall be maintained throughout the coordination and construction phase, indicating all equipment and trades' work clearly. All equipment, including piping, etc. shall clearly identify both top and bottom elevations as well as distances from equipment to established building lines. Coordinate with other trades and field conditions and show dimensions and details including building construction and access for servicing. All changes in the work shall be recorded on this set on a daily basis. In addition to changes made during course of work, show the following:
    a. Exact location, type and function of concealed valves and controllers.
    b. Exact size, elevations, and location of underground and under floor piping.
2. Final construction drawings and specifications, with as-constructed information added, are to be submitted as record drawings at completion of project. Plans are to incorporate all addenda items and change orders. Submit to Architect for approval.

J. Warranty
1. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.

1.03 DEMONSTRATION & TRAINING

A. Comply with the requirements of Division 01 and the following.
1. Prepare formal training program for operating staff prior to the scheduled start-up date. The program shall consist of the design, start-up, and operation of the HVAC systems. The training program shall be coordinated with production of the operation and maintenance manuals. Operations and Maintenance data is to be available for training sessions.

1.04 COMMISSIONING

A. Commission all equipment and control devices, including sensors, valves, actuators, controllers, and related devices. Commission all sequence of operation. Commissioning a limited sample of devices and control sequences is not allowed.

PART 2 PRODUCTS

2.01 REFRIGERANT PIPING

A. Refrigerant piping shall be Type ACR, ASTM B 280, drawn temper, seamless copper tube.

B. Pipe fittings and unions shall be wrought copper with brazed joints. ASME B16.22. Mechanical joints on refrigerant piping are prohibited. All refrigerant piping joints shall be brazed with lead-free silver brazing alloy, minimum 15% silver content. Harris "Stay Silv 15" or equal.

C. Flexible connectors shall be bronze, double braided, with inlet and outlet connections as required. Metraflex RAF series or equal.

D. Sight glasses shall be color change moisture indication type, replaceable element, filter screen and pad, sweat solder ends. Sporlan “See-All”, Henry, or equal.

E. Charging and purge valves shall be forged brass, diaphragm packless, globe type, angle or straight through, one end solder, one end flare. Henry 623 and 643 series, Sporlan, or equal.

F. Solenoid valves shall be of forged brass, extended solder end connections, molded coil; Sporlan “E” series or equal. ARI 760 & UL 429

G. Filter driers shall be replaceable media, angle type, AHRI 730 compliant; Henry “Dri-Cor” or equal.

H. Electronic thermostatic expansion valves shall have stainless steel body and connections, ceramic slide and port, linear flow capacity, continuous modulation, and direct coupling of motor and valve; Emerson “EX” series or equal.

I. Isolation/shut off valves shall be Mueller Streamline “Cyclemaster” series ball valves or equal. 700 psig maximum working pressure. Valves shall be compatible with all CFC, HCFC and HFC refrigerants and oils, be full port construction to match line size ID, and shall have internally equalized ball design, rupture proof encapsulated stem and shall be UL Listed and CE Certified. -40°F/300°F working temperature range.

J. Expansion loops shall be Metraflex “Metraloop" or equal. Provide as required to accommodate any thermal expansion or contraction or as indicated on the Drawings. Return fitting shall be supported to allow movement.

K. Pipe hangers: All refrigerant piping shall be supported 8 feet on center and within 2 feet of a change in direction of the piping. Piping shall be supported at points not more than 15 feet apart.

L. Split system fan-coil units and heat pump units shall have brazed sweat-fitting connections on the refrigerant piping between the units with a flexible piping section at the outdoor unit.

M. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

N. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

O. Escutcheon plates shall be provided around horizontal and vertical piping at visible penetrations through walls, partitions, floors, or ceilings, including penetrations through closets, through below ceiling corridor walls, and through equipment room walls and floors.

2.02 UNIONS

A. Unions or flanges shall be furnished and installed at each threaded connection to all equipment or valves. The unions shall be located so that the piping can be easily disconnected for removal of the equipment, tank, or valve, and shall be of the type specified in the following:
   1. Steel Pipe: malleable iron, 150 lb., ground joint, Anvil figure 463, Kuhns, or equal.

2. Copper pipe: cast copper alloy, soldered joint: NIBCO series 633 or 733, Mueller Streamline, or equal. MSS SP-123
3. Dielectric: lead free, Watts, Jomar, or equal. ASSE 1079

2.03 ACCESS DOORS

A. Where construction is not inherently accessible, provide adequately sized and conveniently located access doors in ceilings, walls, and furring for access to controls and for servicing valves, equipment, etc.
   1. Fire Rated walls and ceilings: Milcor, Style UFR, U.L. Class B, 1½ hour rating, insulated, self-closing, self-latching, flush key operated cylinder lock, interior latch release. Minimum size shall be 12" x 12". Provide larger sizes where required.
   2. Drywall ceilings or walls: Milcor, Style DW, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12" x 12". Provide larger sizes where required.
   3. Masonry and tiled walls: Milcor, Style M, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12" x 12". Provide larger sizes where required.
   4. Plastered walls and ceilings: Milcor, Style K, prime coated steel, flush screwdriver-operated cam lock. Minimum size shall be 12" x 12". Provide larger sizes where required.
   5. Access panels for identifying valves shall be no smaller than 8"x8".

B. Doors shall be delivered to the General Contractor for installation.

2.04 DUCTWORK

A. Sheet Metal Ductwork:
   1. Ducts and plenums shall be fabricated and installed in conformance with the latest editions of NFPA 90A; 2022 California Building Code; 2022 California Mechanical Code, and SMACNA HVAC Duct Construction Standards (Metal & Flexible), third edition. All factory-fabricated duct systems and closure systems shall comply with UL 181. In addition, tapes, sealants, mastics, and other closure systems shall meet the applicable requirements of UL 181, UL 181A, or UL 181B.
   2. Ducts and plenums shall be constructed of G-60 coated galvanized steel of lockforming grade conforming to ASTM A653 and A924 Standards. Seals shall be airtight Class "A" seals at all transverse joints and longitudinal seams. Tables and figures hereinafter referenced are from the 3rd edition of the SMACNA HVAC Duct Construction Standards (Metal and Flexible).
   3. Rectangular duct construction shall conform to Table 2-3. All transverse joints shall be flanged per Table 2-32, with corner closures or "Duct Mate" flanged connections with corner closures per Figure 2-16 or 2-17. Elbows shall be standard radius (Type RE 1) or square throat with vanes (Type RE 2) per Figure 4-2, with double thickness turning vanes per Figures 4-3 and 4-4. Offsets and transitions shall be per Figure 4-7. Supply, return, and exhaust branch connections shall be per Figure 4-5 or 4-6. Splitters SHALL NOT be used.
   4. Round ducts shall be spiral, McGill Airflow or equal. All transverse joints and longitudinal seams shall have Class "A" seals. All branches in round duct systems shall be made with factory fabricated reducing wye branches. Duct turns shall be made with standard factory-fabricated three-piece elbows.
   5. Lined ducts shall be fabricated such that the net inside dimensions equal the duct sizes shown on the Drawings.

B. Flexible ducts shall be acoustical type, Flexmaster "6M", Casco "Silent Flex II" model SF-181M, or approved equal. Flexible ducts shall be used only where shown on the Drawings, and maximum length of any given flexible duct shall not exceed 5 feet. Galvanized sheet metal elbows shall be used for turns greater than 45 degrees on flexible ducts 10 inches and larger. Connections to rectangular ducts shall be made with "spin-in" fittings with air scoops. The installation of flexible ducts shall conform to Figure 3-10, with the exceptions noted herein.

1. Supports for horizontal ducts and plenums shall be fabricated per Figures 5-5 and 5-6 and Tables 5-1, 5-2, and 5-3. The maximum distance between hangers shall be 8 feet for rectangular ducts and 12 feet for round ducts. Attachments to the structure shall be made with adequately sized lag bolts for strap hangers and
adequately
sized machine bolts and side beam brackets for rod hangers. Supports for vertical ducts shall be band iron strap or angle bracket type per Figures 5-8 and 5-9.
2. All roof-mounted ductwork shall be water-tight and sloped to shed water. All transverse joints shall be T-25 flanged Ductmate "25" or approved equal.
3. Outside air intakes shall be type 316 stainless steel.

C. Fiberglass Ductwork:
1. Fiberglass ductwork is unacceptable and may not be used on this project.

D. Specialties:
1. Duct Mounted Access Doors
   a. Including those for removing filters, duct access doors shall be fabricated as detailed in Figure 7-2, with sash locks, piano hinges, and gaskets. Round duct shall be fabricated as detailed in Figure 7-3.
   b. Access doors shall be double wall, rectangular, insulated or uninsulated same as duct. Insulation fill and thickness shall be as indicated for pressure class.
   c. Access doors shall have a vision panel and shall have an unobstructed full swing. Fabricate doors airtight and suitable for duct pressure class.
2. Dampers:
   a. Provide butterfly or multiple blade dampers, where indicated on the Drawings or as required for balancing air quantities, to values shown, without generating excessive noise. Provide Duro-Dyne "KS-385" or approved equal, locking quadrants on each manual damper. Locate dampers in furred ceilings near access panels, where possible.
   b. Butterfly dampers shall be constructed per Figure 7-4, Figures A, B, and C.
   c. Multi-blade dampers shall conform to Figure 7-5.
   d. Backdraft dampers: Ruskin CBD6 or approved equal, heavy-duty dampers with 12-gauge galvanized steel structural brace at each corner. Blades shall be of extruded aluminum with extruded vinyl blade edge seals mechanically locked into blade edge. Corrosion resistant bearings, long life synthetic type. Linkage shall be tiebar connected to stainless steel pivot pins.
3. Remote Actuators: Young Regulator Company, Round Cable Controlled Dampers, model 5020-CC or 830A-CC (rectangular) and Remote Cable Control System Kit, model 270-301EZ. All dampers in inaccessible ceilings shall have remote actuators.
4. Air Extractors: Duct mounted volume extractors made of galvanized steel with 1-inch blade spacing, Titus model AG-45, or equal.
5. Flexible Duct Connections: Duro-Dyne "Metal-Fab" constructed of Durolon, or Ventfabrics "ventglas", or approved equal. Install at each point where a blower unit is connected to a duct. A minimum clearance of 3 inches between the duct and the source of vibration shall be maintained. Install per Figure 7-8.
6. Screens: Install removable bird screens at all outside air intakes and exhaust air discharges. Screens shall be fabricated from ½ inch x 14-gauge mesh secured in full frames. Screens and frames shall be constructed of the same material as the duct, hood, or equipment to which attached.
7. Access Panels: Milcor, Style M, prime coated steel, or approved equal. The minimum size shall be 10" x 10". Provide larger sizes where required. Locks shall be flush, screwdriver operated. Provide as required for concealed ducts at all fire dampers, electric duct heaters, and automatic dampers, except at suspended acoustical ceilings.

8. Duct Sealing: All ductwork, regardless of system pressure classification, shall be sealed in accordance with Seal Class A. Tapes, sealants, mastics, and other closure systems shall meet the applicable requirements of UL 181, UL 181A, and UL 181 and shall be non-toxic and water resistant. Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723. Sealants for interior applications shall pass ASTM C 731 and D 2202. Carlisle "Hardcast DS-321", CCWI-181, or equal.

2.05 VIBRATION ISOLATORS

A. Unless otherwise noted on the equipment schedule, all mechanical equipment shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. All isolators shall be Mason Industries, Kinetics, or approved equal. Rated deflections and model numbers shall be as scheduled on the drawings.

B. Spring equipment mounts, earthquake motioned restrained:
   1. Mounts shall incorporate a single spring vibration isolator built into a welded steel mount assembly, designed, and engineered to limit movement of supported equipment during an earthquake without degrading the vibration isolation of the spring during normal equipment operating conditions.
   2. Mounts shall incorporate a welded steel plate and motion limit assembly, and steel spring isolator, engineered as a system to accept a force of 1.3 times the rated load capacity of the spring isolator without yield or failure, and shall limit movement of the point of level bolt connection to supported equipment to 0.75 inches in any direction, relative to any fixed point on the mount assembly, while subjected to the minimum force specified.
   3. The motion limit assembly shall be welded to a steel base plate having a ¼" thick ribbed neoprene noise stop pad, and drilled holes for bolting to supporting structures.
   4. Springs shall be wound steel, using high strength, heat treated spring alloy steel and shall have a horizontal spring stiffness equal to or greater than 1.3 times the rated vertical spring stiffness. The outside diameter of each spring shall be a minimum of 0.8 times the rated vertical spring height.
   5. Springs shall be selected to provide the tabulated minimum operating static deflections and shall provide a 50% overload capacity before reaching solid state. Springs shall be designed to reach a solid state before exceeding the spring steel fatigue point.

2.06 FILTERS

A. Unless indicated otherwise on the equipment schedule, air filters shall be as follows. Filters shall be 2" completely disposable type with fiberglass media, AAF/Flanders "Pre-Pleat M13", Camfil "AP-Thirteen", or approved equal, UL Class 2 listed. Permanent washable types are not acceptable. Change filters at job completion and furnish one complete filter change boxed at the jobsite for owner.

B. Each filter shall consist of synthetic only media, with corrosion-resistant expanded metal backing and moisture resistant enclosing frame. The filter shall be 2" nominal depth. The grid shall be 100% bonded to the media on the air exiting side to eliminate media vibration and pull-away.

C. The grid shall be formed to provide a uniform V-wedge shaped pleat with the open area on the air exiting side for maximum utilization of the media and low airflow resistance. The filter shall be classified for flammability by Underwriters Laboratories, Standard 900 as Class 2.

D. The filter shall have a Minimum Efficiency Reporting Value (MERV) of 13 by ASHRAE Standard 52.2.

E. During construction, protect all filters upstream of air handling units with blankets of 2" fiberglass filter media or 2" disposable panel filters. UL Class 2 listed. Remove after balancing, and prior to acceptance. Filters to be provided during construction, upstream of air handling units, at return grilles, or any other return duct openings shall be Camfil "30/30" pleated panel filters, AAF/Flanders, or approved equal. MERV 8

F. Systems shall not be operated without properly installed filters, including temporary filters for use during construction. If the final pressure drop of the temporary filters is reached during the construction or test and balance, replace them with the spare set. If not used, the spare set is to be delivered to the Owner at the time of acceptance.

2.07 INSULATION

A. General
1. All duct insulation materials including jackets, tapes, adhesives and coatings shall meet ASTM E84/UL 723 "25/50 Flame Spread/Smoke Development" requirements and NFPA 90A and 90B.

B. Exterior of Ductwork: (Flexible Duct Wrap)
1. Unless specified to be lined, all ductwork shall be externally insulated by wrapping with formaldehyde-free, flexible glass fiber blanket or inorganic glass mineral wool wrap, with factory applied FSK vapor barrier jacket. The thickness shall be 2 inches unless noted or required otherwise.
2. Duct wrap shall meet the requirements of ASTM C1290, ASTM C553, and ASTM C1136. Corrosiveness shall meet ASTM C665. Mold growth/fungi resistance shall meet ASTM C1338.
   a. Johns Manville "Microlite FSK", Knauf "Atmosphere Duct Wrap", or Certainteed "SoftTouch" or "Wide Wrap".

C. Interior of Ductwork: (Duct Liner)
1. All ducts exposed to the weather shall be internally insulated. All other ductwork within 10 feet of a fan (supply and return) shall be internally insulated. Duct liner shall be installed in supply and return ducts and plenums, where noted on the Drawings. Exhaust ductwork need not be insulated.
2. Duct liner shall meet the requirements of ASTM C1071. Operating temperature shall meet ASTM C411. Microbial growth shall meet ASTM C1338, and ASTM G21 and G22.
   a. Type I - Flexible Duct Liner: Johns Manville "Linacoustic RC", Knauf "Atmosphere Duct Liner", or Owens Corning "QuietR Rotary Duct Liner". Thickness shall be 1 ½ inches, unless otherwise noted.
   b. Type II - Plenum Liner Board: Johns Manville "Linacoustic R-300", Owens Corning "QuietR Duct Liner Board", or Knauf Insulation "Atmosphere Rigid Plenum Liner". Thickness shall be 1 ½ inches, unless otherwise noted.

D. Refrigerant Piping:
1. Insulate all refrigerant liquid, vapor, and suction lines, fittings, and valves with "Armacell" flexible elastomeric thermal insulation, Resolco Insul-Phen rigid closed cell phenolic foam, or equal. Install according to manufacturer's suggested installation procedures, UV protected.
2. Liquid, suction, and hot gas (where applicable) lines shall be insulated individually.
3. Oil equalization lines between multiple condensing units shall be insulated.
4. All piping exposed to the weather shall be finished with aluminum jacketing with a laminated moisture retarder. ITW Insulation Systems, RPR Products "Insul-Mate" or approved equal. Aluminum jacketing shall be overlapped 2 to 3 inches and held in place with stainless steel bands to form a weather tight system. Elbows and tees shall be fitted with matching aluminum fitting covers. Other fittings in metal-jacketed systems shall be

finished with conventional weather-resistant insulating materials with painted aluminum finish.

E. Piping insulation thickness shall be as follows:

FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)				
			1 and less	1 to <1.5	1.5 to < 4	4 to < 8	8 and larger
			INSULATION THICKNESS REQUIRED (in inches)				
Space Heating, Hot Water Systems (steam, steam condensate and hot water) and Service Water Heating Systems							
Above 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
251-350	0.29-0.31	200	3.0	4.0	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5
Space Cooling Systems (chilled water, refrigerant and brine)							
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0
Below 40	0.20-0.26	50	1.0	1.5	1.5	1.5	1.5

F. All tanks, expansion tank, pumps, volutes, valves, and strainers shall be completely insulated with ½" AP Armaflex glued and sealed vapor tight in place with Armstrong #520 adhesive.

2.08 REGISTERS, GRILLES, AND DIFFUSERS

A. Air terminals shall be Titus, or approved equal, as scheduled on the Drawings.

B. All terminals shall be steel and shall be factory painted. The finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H.

C. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.

D. The manufacturer shall provide published performance data for the diffusers and grilles. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

E. Air terminals for installation in gypsum board shall have a 1" border for surface mounting. All air terminals for installation in lay in ceilings shall have a lay in frame to match the specified grid system.
   1. Exhaust Grilles (EG)
      a. Exhaust return grilles shall be model 50F. Return grilles must provide a free area of at least 90%. Outer borders shall be constructed of heavy extruded aluminum with a thickness of 0.040-0.050 inch and shall have countersunk screw holes. Border width shall be 1¼" on all sides and shall be interlocked at the four corners and mechanically staked to form a rigid frame.
      b. Aluminum grid: ½ x ½ x ½ inch.

2.09 EXHAUST FANS

A. Greenheck "G" series, roof mounted exhaust fans as scheduled on the Drawings or approved equal Cook. The fan shall be downblast type with maximum continuous operating temperature of 180ºF. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

B. Wheel
   1. The fan wheel shall be constructed of aluminum, and be non-overloading, backward inclined centrifugal type and shall include a wheel cone carefully matched to the inlet cone.
   2. Wheels shall be statically and dynamically balanced according to AMCA Standard 204-05.

C. Housing
   1. The housing shall be leak proof and have a rigid internal support structure. All components shall have final thicknesses equal to or greater than preformed thickness.
   2. The motor cover, shroud, curb cap, and lower windband be constructed of heavy gauge aluminum. The shroud and motor cover shall be drawn from a disc. Air shall be directed downward.
   3. The lower windband shall have a formed edge.
   4. The curb cap shall have pre-punched mounting holes.
   5. The housing supports and drive frame assemblies shall be constructed of heavy gauge steel and mounted on rubber vibration isolators sized to match the weight of each fan.

D. Motor (ECM)
   1. The motor enclosure shall be open type.
   2. Motor to be a DC electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable.
   3. The motor shall be permanently lubricated, heavy duty ball bearing type, prewired to match voltage and phase. The internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor.
   4. Motor shall be speed controllable down to 20% full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal.
   5. Motor shall be a minimum of 85% efficient at all speeds.

E. A NEMA rated positive electrical shut-off disconnect switch shall be factory installed and wired from the fan motor to a junction box within the motor compartment.

F. Options/Accessories
   1. Birdscreen, galvanized.
   2. Roof curb, welded, galvanized, straight sided curb with 2" flashing flange and wood nailer, mounted onto roof with fan.

2.10 SPLIT SYSTEM AIR CONDITIONING

A. Daikin outdoor unit model RXF24AXVJU and indoor unit FTXF24AXVJU as scheduled on the Drawings or approved equal.

B. The variable capacity, heat pump system shall be a Daikin Inverter Driven series (heat/cool model) split system. The system shall consist of a wall mounted evaporator matched to outdoor a direct expansion (DX), air-cooled, Daikin swing, variable speed, inverter driven compressor using R-32 refrigerant. The outdoor unit is a horizontal discharge, variable speed, single fan unit using a single-phase power supply. The system shall have a self-diagnostic function, 3-minute time delay mechanism and have a factory pre-charge of R-32 adequate for 33 feet of total line set length. The system shall have automatic restart capability after a power failure has occurred and a low voltage cut-off feature to prevent stalling during power supply issues.

C. Quality Assurance
   1. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL C22.2 No. 60335-2-40– Heating and Cooling Equipment and bear the Listed Mark.
   2. All wiring shall be in accordance with the National Electric Code (NEC).
   3. Each combination shall be rated in accordance with Air Conditioning Refrigeration Institute's (ARI) Standard 210/240 and bear the ARI label.
   4. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.
   5. The outdoor unit will be factory charged for a line set length of 33 feet of refrigerant with R-32 refrigerant.
   6. A holding charge of dry nitrogen shall be provided in the evaporator.
   7. System Efficiency shall meet or exceed 21 SEER2, 12.0 EER2 and 9.1 HSPF2.

D. Warranty
   1. Commercial Installations: This warranty applies to heating and air conditioning units installed in buildings other than residences and covers defects in materials and workmanship that appear under normal use and maintenance. Warranty coverage begins on the "installation date". The installation date is one of two dates: (1) The installation date is the date that the unit is originally installed. (2) If the date the unit is originally installed cannot be verified, the installation date is 3 months after the manufacture date. The warranty lasts for a period up to 5 years.

E. Installation Requirements
   1. Installation must comply with installation manual. It is recommended the system be installed by a contractor/dealer who has been through Daikin training programs.

F. Indoor Unit
   1. The indoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. Both liquid and suction lines must be individually insulated between the outdoor and indoor units.
   2. Unit Cabinet:
      a. The indoor unit shall have a white, "wipe-clean" finish.
      b. The drain and refrigerant piping shall be accessible from six (6) positions for flexible installation (right side, right back, and right bottom; and left side, left back, and left bottom.
      c. The cabinet shall be supplied with a mounting plate to be installed onto a wall for securely mounting the cabinet.
      d. The cabinet includes:
         1) Indoor unit ON/OFF switch, capable of being used when the remote controller is missing. When switch is used, the default setting is AUTO mode, 76°F temperature setting, and AUTO airflow rate.
         2) OPERATION lamp that turns blue in COOL mode, yellow in FAN mode and orange in HEAT mode.
         3) TIMER lamp that blinks when activated
         4) A Signal Receiver that receives signals from the remote controller at a maximum distance of 23 ft. When the unit receives a signal, you will hear the following: 2 beeps – operation start, 1 beep – Setting changed, 1 long beep – Operation stop.
   3. Fan:
      a. The evaporator fan shall be an assembly consisting of a direct-driven fan by a single motor.

b. The fan shall be statically and dynamically balanced and operate on a motor with permanent lubricated bearings.
c. An auto-swing louver for adjustable air flow (vertically) is standard via the wireless remote control furnished with each system.
d. The indoor fan shall offer a choice of three speeds, plus quiet and auto settings.
e. The indoor fan shall be removable without the need to detach the heat evaporator coil or blower.

4. Filter:
   a. The return air filter provided will be a washable filter. Two titanium apatite air-purifying filters are included for additional air filtration.
5. Coil:
   a. The evaporator coil shall be a nonferrous, aluminum fin on copper tube heat exchanger.
   b. All tube joints shall be brazed with silver alloy or phoscopper.
   c. All coils will be factory pressure tested.
   d. A detachable condensate pan shall be provided under the coil with a drain connection.
   e. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film, rated for up to 500 hours salt spray.
6. Electrical:
   a. The outdoor unit shall be powered with 208-230 volts, 1 phase, and 60 hertz power. The indoor unit shall receive 208-230 volt, 1 phase, 60 hertz power from the outdoor unit.
   b. The allowable voltage range shall be 187 volts to 253 volts.
7. Control:
   a. The unit shall have a backlit, wireless remote infra-red controller capable to operate the system. It shall have Cooling Operation, Heating Operation, Automatic Operation, Dry Operation and Fan Only Operation.
   b. The controller shall consist of an On/Off Power switch, Mode Selector, Fan Setting, Swing Louver, On/Off Timer Setting, Temperature Adjustment, °C or °F Temperature Display, Eco+ Mode, Quiet, Sleep, LED and Powerful Operation.
      1) On/Off switch powers the system on or off.
      2) Mode selector shall operate the system in auto, cool, heat, fan, or dry operation.
      3) Fan setting shall provide three fan speeds, plus quiet and auto settings.
      4) Swing louver shall adjust the airflow (horizontal and vertical) blades.
         a) Vertical movement controlled via remote, horizontal movement controlled manually.
      5) On/Off timer is used for automatically switching the unit on or off at specific times during the day.
      6) Temperature adjustment allows for the increase or decrease of the desired temperature.
      7) Eco+ operation adjusts the operating condition to energy saving level by limiting the maximum power consumption of the air conditioner unit.
      8) Quiet operation reduces indoor unit sound pressure level by reducing the indoor unit fan speed.
      9) Sleep operation automatically adjusts the temperature setting 0.9°F (0.5°C) up each hour for two hours in COOL to prevent excessive cooling during sleeping hours.
      10) LED button shall change the indication display on the indoor unit.
      11) Powerful operation allows quick cool down or heating up in the desired space to achieve maximum desired temperature in the shortest allowable time period.
   c. The controller shall be able to display two-digit fault codes extracted from the indoor unit to aid in troubleshooting.
   d. Temperature range on the remote control shall be 60°F to 86°F in COOL mode, 60°F to 86°F in HEAT mode, and 60°F to 86°F in AUTO mode. The temperature shall be controlled in 1° increments.

e. The indoor unit microprocessor has the capability to receive and process commands via return air temperature and indoor coil temperature sensors enabled by commands from the remote control.
f. The unit shall also have the capability to connect to a smart-device app via wireless adapter.

8. Sound:
   a. Indoor unit sound levels shall not exceed:

Indoor Daikin Model	Cooling Mode Sound Level (H/M/L/SL) dB(A)	Heating Mode Sound Level (H/M/L/SL) dB(A)
FTXF24AXVJU	53 / 45 / 39 / 34	53 / 43 / 38 / 34

*values are measured approximately 3 feet away with JIS standard operating conditions.

G. Outdoor Unit
1. The outdoor unit shall be specifically matched to the corresponding indoor unit size. The outdoor unit shall be complete factory assembled and pre-wired with all necessary electronic and refrigerant controls. The outdoor shall be controlled by a microprocessor and dedicated EEV's shall be provided for capacity control during part load of the indoor unit.
2. Unit Cabinet:
   a. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.
   b. The outdoor unit will come furnished with four (4) mounting feet, mounted across the base pan, to allow bolting to a cement pad or optionally supplied mounting bracket.
   c. This assembly will be able to withstand a maximum rated wind pressure of 119psf Lateral, 93psf Uplift. See document TER-16-3088.
3. Fan:
   a. The fan shall be a direct drive, propeller type fan.
   b. The motor shall be inverter driven, permanently lubricated type bearings, inherent.
   c. A fan guard is provided on the outdoor unit to prevent contact with fan operation.
   d. Airflow shall be horizontal discharge.
4. Coil:
   a. The outdoor coil shall be nonferrous construction with corrugated fin tube.
   b. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic, rated for up to 500 hours salt spray.
   c. Refrigerant flow from the condenser will be controlled via a metering device.
   d. Automatic defrost will remove any frost from the outdoor unit allowing the system to maintain heating capacity.
5. Compressor:
   a. The outdoor compressor shall be a patented, variable speed Daikin swing inverter-driven compressor. The one-piece action reduces noise, extends life, boasts higher efficiency and reduces energy consumption.
   b. The outdoor unit shall have an accumulator and four-way reversing valve.
   c. PVE Refrigerant Oil shall be used to provide improved lubrication & better chemical stability, and no hydrolysis, leading to higher product reliability.
   d. The compressor shall have an internal thermal overload.
   e. The outdoor unit can operate with a maximum vertical height difference of 49-1/4 feet for 9k btu and 12k btu and 65-5/8 feet for 18k btu and 24k btu without any oil traps or additional components.

f. The outdoor unit can operate with an overall maximum length of 65-5/8 feet for 9k btu and 12k btu and 98-1/2 feet for 18k btu and 24k btu without any oil traps or additional components.

6. Electrical:
   a. The electrical power requirement is 208-230 volt, 1-phase, and 60 Hz power.
   b. The voltage range limitations shall be a minimum of 187 volts and a maximum of 253 volts.
7. Sound:
   a. Outdoor unit sound levels shall not exceed:

Outdoor Daikin Model	Cooling Mode Sound Level dB(A)	Heating Mode Sound Level dB(A)
RXF24AXVJU	55	55

*values are measured approximately 3 feet away with JIS standard operating conditions.

H. System Diagnostics
   1. The system shall be capable of producing 2-digit fault codes:
      a. Controls
         1) I/R controller
         2) Wi-Fi module
         3) Wired controller
   2. D-Checker software: The D-Checker software has the ability to display error codes and values for every sensor on the system through the outdoor unit. The sensor data points shall be graphed or recorded for export to a spreadsheet. The spreadsheet can then be analyzed to troubleshoot operational issues or acknowledge proper operation.

PART 3 EXECUTION

3.01 VERIFICATION OF EXISTING CONDITIONS

A. Information shown relative to existing services is based upon available records and data during preparation of the Drawings but shall be verified. Make reasonable deviations found necessary to conform with actual locations and conditions, without additional charges.

B. Prior to commencing the work of this Section, the Contractor shall inspect the installed work of other trades and verify that their work is sufficiently complete to permit the start of work under this Section, and that the completed work will be in complete accordance with the original design. In the event of discrepancy, immediately notify the Architect and proceed as directed.

3.02 GENERAL INSTALLATION

A. Apply and install all items in accordance with the manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Architect for resolution.

B. Provide all necessary cutting in connection with the work of this Section. No structural members shall be drilled, bored, or notched in a manner which will impair their structural capacity. All penetrations of concrete or masonry shall be made with core drills. No cutting shall be done without the approval of the Architect.

3.03 HVAC EQUIPMENT

A. Move equipment into building through available openings. Dismantle equipment where necessary to accomplish this. After reassembly, test equipment to verify its satisfactory operating condition.

B. Install equipment to provide good appearance, easy access, and adequate space to allow replacement and maintenance. Provide bases, supports, anchor bolts, and other items required to achieve this. Installation shall be level, above moisture level, and adequately braced.

C. All units shall be set with curbs plumb, level, and securely attached through framed opening with bolts and/or lag screws as noted on the Drawings. Connections to ductwork shall be secured, filter racks shall be aligned, enclosures and ductwork connections shall be fully waterproofed, and all utility and control connections shall be complete.

D. Thoroughly lubricate equipment before operating. Repair of damage resulting from failure to comply with this requirement shall be the Contractor's responsibility. Extend ¼-inch schedule 40 black steel lubrication pipes from hard-to-reach locations to front of equipment or to access doors. Terminate with proper lubrication fittings.

E. Connections to piping shall be secured and properly aligned and all utility and control connections shall be properly isolated from the building structure by means of vibration isolators and flexible connections. Any equipment not meeting this requirement will be modified and properly reinstalled at no expense to the Owner.

F. Equipment shall operate quietly and without objectionable vibration. Such problems, other than from equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated at the direction of the Architect.

3.04 INSULATION INSTALLATION

A. Insulation shall be applied on clean, dry surfaces and only after tests and approvals required by the specifications have been completed.

B. Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.

C. Specified adhesives, mastics, and coatings shall be applied at the manufacturer’s recommended minimum coverage per gallon.

D. Edges of vapor barrier insulation at valve stems, instrument wells, unions, and other raw edges shall be sealed adequately to prevent moisture from penetrating the insulation.

E. Insulation Jacketing
   1. Provide aluminum jacketing for all piping located aboveground, outdoors. Jacketing shall be secured to prevent removal without the use of tools.

F. Ductwork
   1. In general, duct system shall be insulated with fiberglass blanket. Insulation on all cold surfaces shall be provided with a vapor barrier jacket.
   2. Ductwork requiring sound attenuation may utilize duct lining with mold, humidity, and erosion resistant surfaces compliant to UL 18

G. Exterior Ductwork:
   1. Duct wrap shall be cut in a manner to meet the manufacturers’ stretch-out guideline to provide a 2" staple lap and have minimum compression at the corners. All joints shall be lapped 2" and stapled with outward clinching staples 2" on center. The insulation shall be mechanically fastened to the underside of all ducts 24" wide or more using cup-head pins,

weld pins, or stick pins with speed clips 18" on center. Insulation shall not be compressed to comply with the required installed R-value. All joints and penetrations of the vapor barrier jacket shall be sealed with a minimum of 3 inch wide matching pressure sensitive tape. Pressure-sensitive tape shall be firmly rubbed in place immediately after application using a "squeegee" type tool.

2. When a vapor seal is required, two coats of vapor retarder mastic reinforced with one layer of 4" wide, open weave glass fabric may be used in lieu of pressure-sensitive tape. Mastic shall be brushed onto joint and glass fabric imbedded in it. A second coat of mastic shall be brushed over the glass fabric until the fabric is filled. Mastics shall be applied in accordance with application instructions on the container.

H. Interior Duct Liner
   1. Apply to the inside face of ducts, coated side facing air stream. Fasten using fire retardant adhesive and secure with mechanical fasteners at 12" maximum o.c., both directions, for velocities up to 2,500 fpm. Velocities over 2,500 fpm shall have fastener spacing of 6" o.c.
   2. Exposed edges must be factory or field coated with adhesive. Metal nosing shall be installed in all liner leading edges facing the airstream at fan discharge, at access doors, and at any interval of lined duct preceded by unlined duct.
   3. Insulation with torn or broken coatings shall be removed and replaced. Loose corners, edges, and butt joints will not be accepted.
   4. Maximum velocity: 5,000 ft/min.

I. Refrigerant Piping:
   1. The insulation shall be installed in accordance with the manufacturer's instructions. All joints and seams shall be sealed with waterproof vapor retarder adhesive. All pipes exposed to the weather shall be coated to protect the insulation from ultra-violet radiation in accordance with the manufacturer's published instructions.

3.05 EXHAUST FAN INSTALLATION

A. Install fans in accordance with manufacturer's instructions and as indicated in the Installation, Operation and Maintenance Manual (IOM) and the contract drawings.

B. Examine areas to receive fans. Notify the Architect of conditions that would adversely affect installation or subsequent utilization and maintenance of fans. Do not proceed with installation until unsatisfactory conditions are corrected.

C. Preparation
   1. Ensure roof openings are square, accurately aligned, correctly located, and in tolerance.
   2. Ensure duct is plumb, sized correctly, and to proper elevation above roof deck. Install duct as specified in "Ductwork".

D. Adjusting
   1. Adjust exhaust fans to function properly.
   2. Adjust belt tension.
   3. Lubricate bearings.
   4. Adjust drive for final system balancing.
   5. Check wheel overlap.

E. Clean as recommended by the manufacturer. Do not use material or methods which may damage the finish surface or surrounding construction.

F. Protect installed product and finished surfaces from damage during construction. Protect installed exhaust fans to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion.

3.06 REFRIGERANT PIPING INSTALLATION

A. Piping installation shall comply with all federal, state, and local regulations and industry guidelines. In addition, the following practices shall be followed.
   1. All piping shall be stored with ends sealed to prevent entry of moisture and debris.
   2. A pipe cutter specific to the piping material applied shall be used.
   3. All factory and field cut tube ends shall be de-burred and cleaned.
   4. Flared fittings shall be formed using tools recommended by the equipment manufacturer.
   5. Flare nuts shall be tightened with torque wrench furnished by the equipment manufacturer.
   6. Piping shall be continuously purged with dry nitrogen while soldering. Care shall be taken when soldering near valves or other equipment that may be damaged by extreme heat.
   7. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

B. Drawing plans, schematics, 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 Shop Drawings.

C. Install refrigerant piping according to ASHRAE 15.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Install piping adjacent to machines to allow service and maintenance.

H. Install piping free of sags and bends. Install fittings for changes in direction and branch connections. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

I. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection.

J. Install refrigerant piping in protective conduit, where installed belowground. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

K. Slope refrigerant piping as follows:
   1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
   2. Install horizontal suction lines with a uniform slope downward to compressor.
   3. Use double-suction riser for maximum compressor efficiencies if load variation is expected.
   4. Install traps and double risers to entrain oil in vertical runs.
   5. Liquid lines may be installed level.

L. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

M. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

N. All refrigerant piping and valves shall be identified.

3.07 FILTERS

A. During construction, protect all filters upstream of air handling units with blankets of 2" fiberglass filter media or 2" disposable panel filters. UL Class 2 listed.

B. Systems shall not be operated without properly installed filters. Filters used during construction shall be removed and replaced with new filters after construction is completed and the systems are ready for final acceptance by the owner.

3.08 DUCTWORK

A. Install ducts according to SMACNAs HVAC Duct Construction Standard, Metal and Flexible, unless otherwise indicated.

B. All ductwork shall be installed within spaces provided where possible. Ducts shall be installed true to line and grade, fully secured to structural framing with specified hangers and supports, insulated, and vibration isolated.

C. Install duct systems as indicated unless deviations to layout are approved on shop drawings.

D. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of the building.

E. Install ducts with the fewest possible joints.

F. Each section of supply air ductwork shall be cleaned of dust and oil at the shop, using a degreasing agent and detergent and shall be sealed airtight at both ends with visqueen and tape. Supply ducts shall be additionally cleaned with a disinfecting solution. The ends of all supply and internally insulated exhaust ducts shall be kept sealed until the time they are joined. When duct sections are joined, wipe down all interior surfaces with a clean tack cloth. If tack cloth shows any dust, then re-clean duct as described above. The intent is that no foreign matter be allowed to enter the ductwork at any time after factory cleaning and during construction.
   1. Unlined exhaust ducts shall be vacuum cleaned when installed but shall otherwise be exempt from shop cleaning and sealing.

3.09 AIR TERMINAL INSTALLATION

A. Examination
   1. Examine areas where registers and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Installation
   1. Install grilles flush against surface wall or lay-in ceiling grid module.
   2. Verify grille air patterns are as indicated on the Drawings during installation.
   3. Ceiling-Mounted Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. Where architectural features or other items conflict with installation, notify Architect for determination of final location.
   4. Install grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors and fire dampers.

C. Adjusting
   1. After installation, verify air flow and volume adjustment if supplied with opposed blade damper as indicated on drawings, or as directed before starting air balance.

3.10 TESTS, INSPECTIONS

A. Contractor shall not allow or cause any work of this Section to be covered or enclosed until it has been inspected, tested, and approved by the Architect and the authorities having jurisdiction over the Work. Should any of this work be enclosed or covered up before such inspection, testing, and approval, this Contractor shall uncover the work, have the necessary inspections, tests, and approvals made and, at NO expense to the Owner, make all repairs necessary to restore both his work and that of other contractors which may have been damaged to be in conformity with the Contract Documents.

B. Furnish all necessary labor, materials, and equipment for conducting tests, and pay all expenses in connection therewith. Should leaks develop while testing, repairs shall be made, and tests shall be repeated until a satisfactory test is obtained.

C. Make all necessary control adjustments and balancing of air and water flows. Operate the entire system for a period of time not less than three (3) working days for the purpose of proving satisfactory performance. During this period, instruct such persons as the Owner and/or Architect may designate in the proper operation of the systems. Should further adjustment prove necessary, operating tests shall be repeated until a satisfactory test result is obtained.

D. Acceptance Testing
   1. The California Energy Code Section 10-103 requires Acceptance Testing on all newly installed mechanical systems envelopes after installation and before project completion. An Acceptance Test is a functional performance test to help ensure that newly installed equipment is operating and in compliance with the Energy Code. The systems must pass the required acceptance criteria. Any deficiencies must be corrected by the installing contractor until the specified systems conform and pass the required acceptance criteria. As of October 2021, all mechanical system acceptance tests must be performed by a certified mechanical acceptance test technician (CMATT) who is trained and certified by an Acceptance Test Technician Certification Provider Program (ATTCP). CMATTs must show that they have a minimum of 3 years of experience working in the area of testing that they will perform.
      a. A listing of certified ATT can be found at https://www.energy.ca.gov/programs-and-topics/programs/acceptance-test-technician-certification-provider-program/acceptance.
   2. The acceptance testing procedures must be repeated, and deficiencies must be corrected by the installing Contractor until the construction/installation of the specified systems conform and pass the required acceptance criteria. Project inspectors will collect the forms to confirm that the required Acceptance Tests have been completed.

E. Refrigerant Piping Testing
   1. Pressure and leak tests on refrigeration piping and equipment shall be done in accordance with local code requirements and ASHRAE Standard 15. Be sure that all controls, relief valves or rupture discs that could be damaged by test pressure are removed before beginning pressure test.
   2. Prior to charging with refrigerant, piping shall be tested for leaks under 550 psi pressure using a mixture of 95% nitrogen and 5% hydrogen gas. (WARNING! OXYGEN OR ACETYLENE SHALL NOT BE USED IN PLACE OF DRY NITROGEN. A VIOLENT EXPLOSION MAY RESULT!).
   3. All joints shall be tested for leaks using an electronic hydrogen leak detector. Pressure and leak tests on refrigeration piping and equipment shall be done in accordance with local code requirements and the American Standard Safety Code for Mechanical Refrigeration (ASA B9.1).

4. Piping shall be continuously purged with dry nitrogen while brazing. Care shall be taken when soldering near valves or other equipment that may be damaged by extreme heat.
5. Precautions shall be taken to keep moisture out of the system, and a drier shall be used.
6. After successful completion of pressure tests, the entire system shall be purged with dry nitrogen and then evacuated with a standard vacuum pump to remove all moisture and non-condensibles. Three evacuations shall be required and shall be down to 500 microns absolute pressure. Break the first two vacuums with dry nitrogen. Charge with refrigerant after third evacuation.
7. The Contractor shall notify the Architect 48 hours prior to the time and date of the evacuation.
8. The refrigerant charge shall be calculated and weighed into the system.
9. Service technicians shall be certified in the use of CFC and HCFC refrigerant recovery and recycling equipment and shall use UL listed and labeled recovery equipment when discharging refrigerant.

3.11 CONTRACTOR RESPONSIBILITIES FOR TEST & BALANCE

A. Before testing or balancing is started, the Mechanical Contractor shall adjust belts and sheaves; align all parts; oil and grease bearings in accordance with manufacturer's instructions; clean exterior surfaces of coil tubes and fins; flush interior of coil tubes, pull until clean; and check mixing damper operation to insure free operation and activation by the correct thermostat.

B. The Mechanical Contractor shall be responsible for certifying in writing that the system, as scheduled for balancing, is operational and complete. Completeness shall include not only the physical installation, but the Mechanical Contractor's certification that the prime movers are installed in good working order, and that full load performance has been preliminary tested under the certification of the Mechanical Contractor. Before any testing and balancing is started, a complete report shall be sent to the T&B Agency by the Mechanical Contractor.

C. The Mechanical Contractor shall be responsible for making all modifications to rectify discrepancies reported by the T&B Contractor as indicating non-compliance with the Contract Documents. By completing the work on time, the Mechanical Contractor shall provide sufficient time before the completion date so that balancing can be accomplished.

3.12 CLEANUP

A. Upon completion of the work of this Section, remove all material, debris, and equipment associated with or used in the performance of this Work.

END OF SECTION

SECTION 23 0500

GENERAL MECHANICAL

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. General requirements specifically applicable to all Division 23 Sections
2. Some piping material and installation instructions common to most piping systems
3. Mechanical demolition (when indicated on the Drawings)
4. Concrete bases
5. Supports and anchorage
6. Pipe and equipment identification
7. Basic electrical requirements
8. Electric motors

1.02 REGULATORY REQUIREMENTS

A. Regulatory compliance: All work performed under Division 23 shall comply with the latest currently adopted editions of all applicable federal, state, and local codes, ordinances, regulations, and all requirements of the Authorities Having Jurisdiction.

B. Electrical devices and wiring shall conform to the latest standards of NEC; all devices shall be UL listed and labeled.

C. Provide in accordance with the rules and regulations of the following:
1. Title 24, California Code of Regulations, Parts 1 -12.
2. Local jurisdiction codes and amendments
3. Health Department
4. California Occupational Safety & Health Administration (CAL-OSHA) Safety Orders and requirements
5. California State Fire Marshal (CSFM)
6. City Fire Marshal requirements
7. Division of State Architect (DSA)
8. Environmental Protection Agency (EPA)
9. National Fire Protection Association (NFPA)

D. Where material or equipment is specified to conform to referenced standards, the most recent edition of the standard in effect at the time of bid shall be used. If compliance with two or more standard establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
1. Associated Air Balance Council (AABC)
2. American Gas Association (AGA)
3. Air Movement and Control Association International, Inc. (AMCA)
4. American National Standards Institute (ANSI)
5. American Society of Mechanical Engineers (ASME)
6. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
7. American Society for Testing and Materials (ASTM)
8. Air-Conditioning and Refrigeration Institute (ARI)
9. Canadian Standards Association International (CSA)
10. National Electrical Manufacturers Association (NEMA)
11. National Fire Protection Association (NFPA)

12. Office of Statewide Health Planning and Development (OSHPD)
13. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Standards
14. Underwriters Laboratories (UL)
15. Comply with all ADA requirements for disabled access.

E. Minimum requirements: The requirements of these are the minimum that will be allowed unless such requirements are exceeded by applicable codes or regulations, in which the regulatory codes or regulation requirements shall govern.

F. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the said laws, rules, and/or regulations, accepting that nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations. The Contractor for this work shall furnish any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specifically set forth in the Contract Documents, with no additional charges to Owner.

G. Seismic construction and restraints shall be in accordance with the requirements of Title 24 of the California Code of Regulations. All equipment mounts, isolators, and hanging systems must meet local authority requirements.

1.03 CONTRACT DRAWINGS

A. The Contract Drawings indicate diagrammatically the general layout of the mechanical systems and other related work. The data given herein and on the Drawings are as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Field verification of scaled dimensions taken from the Drawings is required. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

B. The Contractor shall review and compare the Architectural, Structural, Plumbing, Mechanical, and Electrical Drawings and all Owner supplied equipment Drawings and adjust their work to be in conformity with the conditions indicated thereon. Discrepancies between different Drawings, between Drawings and actual field conditions, or between Drawings and Specifications, shall be brought to the attention of the Architect promptly for a determination of the modifications to be affected.

C. Provide offsets, fittings, and accessories required to meet project conditions, even when not shown.

D. Minor changes in locations of equipment, piping, ducts, 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.

1.04 WARRANTIES

A. Warranty all materials, equipment, and apparatus to be free from defects and faulty workmanship. Warranties shall be in accordance with the provisions of the General Conditions and Special Conditions. Should any defects occur during this period, the Contractor shall repair or replace defective items as directed by the Architect, without cost to the Owner.
   1. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.

B. Provide new materials, equipment, apparatus, and labor to repair or replace that determined to be defective or faulty.

1.05 SUBMITTALS

A. General:
1. All submittals shall be in accordance with the requirements of the General Conditions and Division 01 Sections for Submittal Procedures and Product Requirements.
2. Before any fixtures, materials, or equipment are purchased, the Contractor shall submit to the Architect for approval, a complete list of materials, fixtures, and equipment, giving the manufacturers' names, catalog number, capacity, size, power requirements, and other pertinent data. Submittal lists and drawings shall be specifically applicable to this project, shall include identifying marks assigned by Specifications and Drawings, and shall not contain extraneous material or optional choices.
3. Product names referenced in the specifications are used as standards of quality. Other materials shall not be used unless approved in writing. Review is required even though the term "or equal" is used. Review of submittals will be only for general conformance with design concept. Review will not include quantities, dimensions, construction methods, or coordination with the work of other trades.
4. The Contractor shall submit for the approval of the Architect, shop drawings of proposed material and equipment that differ from the specified materials and equipment, and of any specified materials and equipment with special conditions and/or arrangements. These drawings shall show necessary modifications of Owner, plumbing, electrical and mechanical work required by the proposed materials and equipment.
5. Submittal of substitutions shall be limited to one proposal for each type or kind of item. If the first proposed product submittal is rejected, the Contractor shall then submit the first named or scheduled product. Installation of reviewed substitution is Contractors' responsibility. Any mechanical, electrical, structural, or other changes required for installation of substituted equipment or material must be made by the Contractor without additional cost to Owner. Review by the Architect of substituted equipment or material will not waive these requirements.
6. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements. Review of drawings and other material submitted shall not be construed as a complete check or constitute a waiver of the requirements of the Drawings and Specifications but will indicate that the material submitted is acceptable in quality and utility. This review shall not relieve the Contractor of the responsibility to fit the proposed materials to the spaces provided and to affect necessary rearrangement or construction of other work.

B. Product Data
1. For all HVAC equipment and each type of product indicated, include manufacturer's specifications and data sheets, and certified drawings on major equipment. Include physical and performance data, such as weights, sizes, capacities, required clearances, performance curves, acoustical characteristics, finishes, color selection, and accessories.
2. Include certified drawings on major equipment.

C. Coordinated Layout/Shop Drawings
1. Prepare complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Shop drawings shall be prepared using AutoCAD 2014 or newer and shall be drawn at a minimum ¼" = 1' - 0" scale.
2. All drawings shall be fully coordinated with HVAC, Plumbing, Fire Protection, Electrical, Structural, and Architectural work. Drawings shall be coordinated and dimensioned indicating equipment, pipe, duct, fire protection, and electrical in relation to architectural

and structural features. Indicate exact locations of valves, piping specialties, access doors, etc.

3. Clearly identify and dimension the proposed locations of the principal items of equipment and adequate clearance for all equipment, piping, pumps, valves and other items. Provide detailed layout of all piping systems showing the proposed routes.
4. Show the access means for all items requiring access for operations and maintenance.
5. Submit shop drawings to Architect for approval, prior to fabrication or installation of any work. Do not install equipment or piping until drawings have been approved. Any work installed without prior shop drawing approval shall be removed at the Contractor's expense.
6. Use of contract documents for shop drawings is not acceptable.
7. Any work installed without prior shop drawing approval shall be removed at the Contractors expense.

D. Submit shop-wiring diagrams of temperature controls and air conditioning unit controls for approval. Furnish approved wiring diagrams and assistance to Electrician.

E. Seismic Shop Drawing Submittal (if applicable)
1. Equipment manufacturer shall design, construct, and certify that his equipment satisfies the special minimum seismic resistance requirements for this project and shall submit calculations or test results supporting his certification.
2. Provide submittal for seismic supports, anchorages, and restraints indicated to comply with performance requirements and design criteria.
   a. Calculations performed for use in the selection of seismic supports, anchorages, and restraints shall utilize criteria indicated in Structural Contract Documents.
   b. Supports, anchorage, and restraints for piping, ductwork, and equipment shall be an OSHPD pre-approved system such as Mason OPM #0043-13. Pipes, ducts, and equipment shall be seismically restrained according to the requirements of the current edition of the California Building Code. The system shall have a current OPM number and shall meet additional requirements of the 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.
   c. Bracing of Piping, Ductwork, and Equipment: Specifically state how bracing attachment to the structure is accomplished. Provide shop drawings indicating seismic restraints, including details of anchorage to the building. In-line equipment must be braced independently of piping and ductwork, 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.

F. Field quality-control test reports.

G. Operation and Maintenance Data
1. The Contractor shall provide all operating and maintenance instructions provided by the manufacturer, describing proper operation and maintenance of any equipment and devices installed. Operating and maintenance instructions shall cover maintenance, adjustment, and operation of each piece of apparatus.
2. The Contractor shall also provide a parts list of all equipment and component parts for all equipment under this Section. The equipment list shall include the manufacturer's name, model number, and local representative, service facilities and normal channel of supply for each item.

3. Data shall include a table of contents identifying items therein, and index tabs for each system. Neatly obscure or cross out inapplicable data from manufacturer's literature. Include the following:
4. Manufacturer's brochures, ratings, certified shop drawings, lubrication charts and data, and parts list with part numbers. Mark each sheet with equipment identification number and actual installed condition or system and location of installation. Specifically identify which options are provided.
5. Description of start-up and operating procedures for each system, including controls diagrams and description of operating sequences.
6. Recommend preventative maintenance schedule and procedures.
7. Submit data to the Architect for approval. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.

H. As-built Drawings
1. Complete and detailed shop drawings shall be maintained throughout the coordination and construction phase, indicating all equipment and trades' work clearly. All equipment, including piping, etc. shall clearly identify both top and bottom elevations as well as distances from equipment to established building lines. Coordinate with other trades and field conditions and show dimensions and details including building construction and access for servicing. All changes in the work shall be recorded on this set on a daily basis. In addition to changes made during course of work, show the following:
   a. Exact location, type and function of concealed valves and controllers.
   b. Exact size, elevations and location of underground and under floor piping.
2. Final construction drawings and specifications, with as-constructed information added, are to be submitted as record drawings at completion of project. Plans are to incorporate all addenda items and change orders. Submit to Architect for approval.

I. Warranty
1. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.

1.06 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall be responsible for the delivery, storage, protection, and placing of all equipment and materials.

B. The Contractor shall protect the work and materials from damage during construction. Equipment stored at the job site shall be protected from dust, water, or other damage, and be covered if the equipment is exposed to weather. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

C. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.

D. Cleanliness of Piping and Equipment Systems:
1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading, and welding of piping.
2. Piping systems shall be flushed, blown, or pigged as necessary to deliver clean systems.
3. The Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.07 COOPERATION WITH OTHER TRADES

A. Coordinate HVAC work with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with, or require coordination with the work of this Section, and schedule this work accordingly.

B. Priority of right of way in space shall be as follows, in decreasing order of authority:
   1. Electrical lights, electrical panels, and drain piping.
   2. Ductwork.
   3. Fire protection piping, domestic hot water, domestic cold water, and condenser water piping.

C. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to the Owner.

1.08 FEES AND PERMITS

A. Obtain permits and services required in the installation of the Work. Arrange for required inspections and secure approvals from Authorities Having Jurisdiction.

1.09 UTILITY CONNECTIONS

A. Arrange for all utility connections, determine their exact requirements, and pay all costs incurred. Send proper notices, make necessary arrangements, and perform other services required for care and maintenance of all utilities, and assume all responsibility concerning same. Observe all rules and regulations of the respective utilities in executing the work.

1.10 ELECTRICAL REQUIREMENTS

A. Electrical work in this Section shall conform to the requirements of Division 26. Equipment shall conform to the standards of the National Electric Manufacturer's Association. Electrical equipment shall bear the label of Underwriters' Laboratories, Inc. where examination and listing service are available for such materials. Motors and motor control equipment shall be as specified herein.

B. Refer to Division 26 for conduit fittings and devices, service voltage and power feed wiring, and control and interlock wiring for equipment specified under this Section. The Contractor shall have a responsibility to verify that the electrical services provided are adequate and compatible with equipment requirements.

C. Electrical work shall include the furnishing of:
   1. Duct mounted smoke detectors
   2. Motor starters, 3-phase
   3. Disconnects/circuit breakers, unless specifically called for in equipment schedules or specifications to be factory installed with equipment
   4. Smoke control interlocks to HVAC fans
   5. Electrical systems
   6. Power wiring, including raceway, fittings, wire, boxes and related items, all voltages, that is not part of Controls Contractor work
   7. Control & interlock wiring that is not part of Controls Contractor work.

D. Electrical work shall include the installing of:
   1. All smoke detectors, except duct-mounted
   2. Smoke control interlocks to HVAC fans

3. Variable speed drives, field mounted
4. Motor starters, 3-phase
5. Disconnects/circuit breakers, unless specifically called for in equipment schedules or specifications to be factory installed with equipment
6. Electrical systems
7. Low voltage wiring, line voltage "interlock" wiring, control wiring for safety devices, alarms, and refrigeration.

E. Controls Contractor shall furnish and install:
1. Refrigerant leak detectors, including control & interlock wiring
2. Control system network backbone
3. Window switches
4. Control panels
5. Control devices
6. Control damper actuators
7. Terminal box control transformer panels
8. Digital controller and damper actuator
9. Air-flow measurement transducer and piping
10. Wall sensor modules.

F. Controls Contractor shall furnish, and Mechanical Contractor shall install:
1. Automatic isolation and control valves
2. Sensor wells, meters, and other pipe-mounted control devices
3. Wiring includes all connections to devices, and all wiring shall be installed in conduit.
4. Conduit fittings and devices shall be as specified in the basic electrical materials section of Division 26.
5. Line voltage work (in equipment assemblies) shall be as specified in Division 26.

G. Devices shall be installed in NEMA enclosures of the type required for the location.

H. Electrical Controls:
1. Refer to Electrical, Fire Protection, Plumbing, and Mechanical documents for work and devices required.

I. The following work will be furnished and installed under Division 26.
1. Disconnect switches, remote switches, motor starters, relays, and test switches that are not mounted as an integral part of equipment assemblies or in temperature control panels.
2. All line voltage controls and interlocks, all other controls, circuits from electric panel board to disconnect switches, starters, motors, switches and/or other motor controls, to temperature controls and safety devices.

1.11 DAMAGE BY LEAKS

A. The Contractor shall be responsible for any damage to the work of other Contractors that is caused by leaks in any temporary or permanent piping systems due to pipe rupture, disconnected pipes or fittings, or by overflow of equipment.

B. Patching and replacing of damaged work shall be done by the Contractor who installed the work, as directed by the Architect, but the cost of same shall be paid by the Contractor who is responsible for the damage.

1.12 LICENSING REQUIREMENTS

A. All work of Division 23 shall be performed by an appropriately licensed contractor. The licenses shall be current, valid through the term of the contract, and in the name of the Contractor.

1. HVAC work that includes warm air heating systems and water heating pumps, ventilating systems, air conditioning systems, and ductwork, registers, flues, humidity, and thermostatic controls in connection with these systems, shall be performed by a C-20 - Warm-Air Heating, Ventilating, and Air-Conditioning Contractor.
2. HVAC work that includes boiler, hot-water heating, and steam fitting shall be performed by a C-4 Boiler, Hot-Water Heating, and Steam Fitting Contractor. The C-4 Contractor installs, services, and repairs power boiler installations, hot-water heating systems, and steam fitting, including firetube and water-tube steel power boilers and hot-water heating low-pressure boilers, steam fitting and piping, fittings, valves, gauges, pumps, radiators, convectors, fuel oil tanks, fuel oil lines, chimneys, flues, heat insulation, and all other equipment, including solar heating equipment, associated with these systems.
3. HVAC work that includes refrigerated spaces, temperature insulation, air conditioning units, ducts, blowers, registers, humidity and thermostatic controls for the control of air, liquid, and/or gas temperatures below 50 degrees Fahrenheit shall be performed by a C-38 Refrigeration Contractor.
4. All plumbing systems shall be installed by a C-36 Plumbing Contractor. A Plumbing Contractor provides a means for a supply of safe water, ample in volume and suitable temperature for the purpose intended and the proper disposal of fluid waste from the premises in all structures and fixed works. Plumbing systems include: waste removal and connection of on-site waste disposal systems; piping, storage tanks, and venting for supply of gases and liquids for any purpose; all gas appliances, flues, and gas connections; water and gas piping from the owner's side of utility meter to the structure or fixed works; installation of any type of equipment to heat water or fluids to a suitable temperature; and maintenance and replacement of the items described above, including health and safety devices such as, but not limited to, gas earthquake valves, gas control valves, back flow preventers, water conditioning equipment, and regulating valves.
5. All air and water balancing shall be performed by a D-62 air and water balancing contractor. An air and water balancing contractor installs any device and performs any work related to providing a specified flow of air in all types of existing heating and cooling systems.

PART 2 PRODUCTS

2.01 PRODUCTS CRITERIA

A. All materials, appliances, and equipment shall be new and the best of their respective kinds, free from defects, and of the make, brand or quality specified or as accepted by the Architect.

B. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

C. Apply and install all items according to the manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Architect for resolution.

D. All fixtures, materials, and equipment equal in quality and utility to these herein mentioned will be accepted. When specific names are used in describing fixtures, materials, and equipment they are mentioned as standards only, but this implies no right on the part of the Contractor to use other fixtures, materials, and equipment, or methods unless approved as equal in quality and utility by the Architect. The decision of the Architect shall govern as to what fixtures, materials, and equipment are equal to those mentioned, but the burden of proof as to the quality of any proposed fixtures, materials, or equipment shall be upon the Contractor. If any tests are necessary to determine the quality of proposed fixtures, materials, or equipment, an unbiased laboratory satisfactory to the Architect shall make such tests at the expense of the Contractor.

2.02 HANGERS, SUPPORTS

A. Piping - General
   1. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for un-insulated copper piping systems.
   2. Hangers and supports shall be designed and manufactured in conformance with ANSI/MSS SP-58. Selection and application shall be according to ANSI/MSS SP-69.
   3. All piping shall be supported with Superstrut, B-Line, Anvil, Mifab, or approved equal pipe hangers and supports. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with shield for insulated piping.
   4. All hangers shall be electro-chromate or corrosion-resistant finished. Hanger rods shall have electro-galvanized finish.

B. Rooftop pipe supports
   1. MiFab "C-Port" series or B-Line "Dura-Block" or approved equal.
      a. Model C rubber support series with 14-gauge galvanized channel.
      b. Seismic: Model CZ rubber base with 14-gauge galvanized channel

C. Copper tubing:
   1. B-Line 3690, Superstrut C-711 or Anvil Figure 67 "J" pipe hangers or approved equal, complete with isolator.
   2. Isolators: B-Line "Vibra Cushion" B1999, Type L & K for copper tubing, Superstrut C-716 isolator for copper, Anvil Figure CT-769 or approved equal

D. Insulated pipe:
   1. Hangers: B-Line 3690 "J" pipe hanger, Superstrut C -711, or Anvil Figure 67 fitted to outside of insulation or approved equal
   2. Pipe Shields: B-Line 3151 insulation protection shield, Superstrut C-790, or Anvil Figure 167 or approved equal

E. Point of support connectors:
   1. Wood construction:
      a. Stationary pipes: B-Line B3060, Superstrut 540 or Anvil Figure 206 side beam hanger clip or approved equal
      b. Pipes subject to movement: B-Line B-756 or Superstrut S-541 beam clamp swing connector or approved equal
   2. New concrete construction: B-Line B2501 light duty spot inserts or Superstrut 452-TB spot inserts or approved equal.
   3. Existing concrete construction: Red Head “Trubolt, Hilti “Kwik Bolt”, Simpson “Stong Bolt” or Hilti “Quik-Bolt”, drilled-in, concrete anchors.
   4. Steel beams: Series 500 beam brackets.
   5. Plywood decks: machine bolts, nuts, and washers.

F. Vertical pipe risers:
   1. Riser clamps: Superstrut C-720 extension riser clamps anchored to construction
   2. Bare cold-water pipe: Superstrut C-720P, PVC coated to prevent corrosion

G. Insulated pipe supports: K.B. Enterprises “Snapp Itz”.

H. Pipes through studs or joists shall be isolated from the structure with properly sized Hubbard "Hold-Rite" suspension clamps or LSP “Acousto-Plumb” system.

I. Ductwork
   1. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

2. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
3. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
4. Steel Cable End Connections: Steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
5. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
6. Trapeze and Riser Supports:
   a. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
   b. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
   c. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

J. Cable Bracing (Ductwork & Piping)
1. Cables shall be pre-stretched galvanized 7x19 strand core aircraft cable, with no limit to their installed length. Cables meet the following specifications: MIL-DTL-83420M with Amendment 2, Type 1 non-jacketed cable.
2. Cables shall be installed slightly slack, so as not to support gravity loads.
3. Cables shall connect the braced item to a building structural element. Cables shall have a bracket at each end to make the connections. The cable assembly with connection brackets shall be Mason Industries "SCB" or "SCBH". The cable is held to end brackets with one or two bolts. Cable bolts shall be tightened to the torque values stated in the details or, in the case where break-off nuts are provided, tighten until the nut breaks off.
4. The Mason Industries "SCBH" component can be used for connection directly to the threaded vertical hanger rod used for supporting system gravity loads as detailed in Section D of OPM-0043-13.
5. The "SCB" bracket and cable (Ref. X1.0), "SCBH" bracket and cable (Ref. X1.1), and "UCC" rod stiffener clamp (Ref. X3.0) manufactured by Mason Industries, are included (with accompanying hardware) in the kit options provided in Section D of OPM-0043-13.

K. Seismic Bracing
1. Seismic cable restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all directional restraint. Cables must be pre-stretched to achieve a certified minimum modulus of elasticity. Cable and connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement. Cables must not be allowed to bend across sharp edges. Cable assemblies shall have an OPM approval from OSHPD in the state of California verifying the maximum certified load ratings. Cable assemblies shall be type SCB at the ceiling and at the clevis bolt, SCBH between the hanger rod nut and the clevis or equipment, or SCBV if clamped to a beam, all as manufactured by Mason Industries, Inc.

2.03 PIPE LABELS

A. Brady, Seton, Graphic Products, or approved equal pipe labels. Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent adhesive backing.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

D. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as a separate unit on each pipe label to indicate flow direction.

E. Label Sizes (per ANSI A13.1 / ASME A13.1-2020 Standards):
   1. For pipes or covering with outside diameter 0.7 to 1.3 inches, minimum length of the color field: 8 inches, minimum height of letters: 0.5 inch.
   2. For pipes or covering with outside diameter 1.4 to 2.4 inches, minimum length of the color field: 8 inches, minimum height of letters: 0.7 inch.
   3. For pipes or covering with outside diameter 2.5 to 6.7 inches, minimum length of the color field: 12 inches, minimum height of letters: 1.3 inches.

F. Pipe Label Color Schedule: (per ANSI A13.1 / ASME A13.1-2020)
   1. Potable, Cooling, Boiler Feed, and other Water Piping:
      a. Background Color: Green.
      b. Letter Color: White.
   2. Fire Quenching Fluids:
      a. Background Color: Red.
      b. Letter Color: White.
   3. Toxic and Corrosive Fluids
      a. Background Color: Orange.
      b. Letter Color: Black
   4. Flammable Liquids:
      a. Background Color: Yellow.
      b. Letter Color: Black.
   5. Combustible Fluids:
      a. Background Color: Brown.
      b. Letter Color: White
   6. Compressed Air:
      a. Background Color: Blue.
      b. Letter Color: White.
   7. Abandoned Pipes:
      a. Background: White
      b. Letter Color: Black

G. Duct Markers:
   1. Self-adhesive duct markers with an arrow indicating the flow direction.

2.04 ELECTRIC MOTORS

A. With exception of motors in UL labeled equipment, motors for HVAC blowers and fans, pumps, and other general-purpose applications using an adjustable speed drive shall be Baldor Premium Efficient Super-E®, three-phase, foot mounted, Class H insulated motor with AEGIS shaft grounding ring installed internally, re-greasable ball bearings, and dynamically balanced rotors.

B. Motors shall be certified for quiet operation and shall bear a label so stating. Motors shall be drip-proof frame, 1.15 minimum service factor, and in 104°F ambient windings specially impregnated and epoxy-coated for outdoor service.

C. Torque characteristics of motors shall be as required to accelerate the machine to 100% full load speed within 10 seconds. Motors shall be dynamically balanced to maximum deflection as follows: 15 HP and larger: 0.0003 inches, 10 HP and smaller: 0.0002 inches.

D. Motors shall be inverter duty, meet NEMA MG-1, Parts 30 and 31, and shall be guaranteed to satisfactorily operate at ± 10% voltage shown on Drawings. Transformers of adequate capacity shall be provided, if necessary, to satisfy this requirement.

E. All 3-phase motors shall be provided with phase and brown-out protection to shut down all motors in the unit if the phases are more than 10% out of balance on voltage or the voltage is more than 10% under design voltage.

F. Fractional horsepower fan motors (¼ hp, ½ hp, ¾ hp) shall be Greenheck "Vari-Green" series motors, DC electronic commutation type, specifically designed for fan applications. Motors shall be permanently lubricated with heavy-duty ball bearings to match the fan load and pre-wired to the specific voltage and phase. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor. Motor shall be controllable down to 20% of the full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal. Motor shall be a minimum of 85% efficient at all speeds.

G. Provide fan drives rated at 150% of motor horsepower. Drives shall be adjustable sheave type unless specified otherwise. Listed fan speeds are only approximate; select and/or change drives to operate at the approximate midpoint of adjustable range after final balancing.

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

A. Provide all necessary sleeving, core drilling, carpentry, cutting, and patching required for proper installation of material and equipment specified.

B. No structural members shall be drilled, bored, or notched in a manner that will impair their structural capacity. No structural cutting or drilling shall be done without the approval of the Architect and DSA.

C. All penetrations of concrete or masonry shall be made with core drills.

3.02 VERIFICATION OF EXISTING CONDITIONS

A. Before commencing the work of this Section, the Contractor shall inspect the installed work of other trades and verify that their work is sufficiently complete to permit the start of work of Division 23 and that the completed work will be in complete accordance with the original design. In the event of a discrepancy, immediately notify the Architect and proceed as directed.

B. Before installation of any new work, verify the location, size, and other conditions at all points of connection to services or other existing piping, and at all locations where new work will cross or pass near existing piping, electrical, or other facilities.

C. Information shown relative to existing services is based upon available records and data during the preparation of the Drawings but shall be verified. Make reasonable deviations found necessary to conform with actual locations and conditions, without extra charge.

3.03 GENERAL DEMOLITION

A. The Contractor shall retain specific equipment as directed by owner and deliver to owner specified location.

B. All equipment, mechanical equipment, piping, valving, controls, etc. rendered useless by this work shall be demolished and removed from the site.

C. Location of existing mechanical equipment, ductwork air outlets, piping, controls, valves, etc. has been based on the best available information obtainable at the site and through record drawings. Contractor shall verify exact locations, sizes, and extent of existing systems prior to start of demolition work.

D. Location of existing hydronic heating piping has been based on the best available information obtainable at the site and through record drawings. Verify exact location, depth and size of existing piping prior to start of demolition work.

E. All unused piping above grade shall be removed. All unused piping below grade shall be capped and abandoned. Cap dead branches as close as possible to live mains.

F. Patch all walls, ceilings, roof and other surfaces to match existing conditions

3.04 POLLUTANT CONTROL

A. At the time of rough installation or during storage on the construction site and until the initial startup of the heating and cooling equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal, or other methods acceptable to the enforcing agency to reduce the amount of dust or debris which may collect in system.

B. During construction, protect all filters upstream of air handling units with blankets of 2" fiberglass filter media or 2" disposable panel filters. UL Class 2 listed.

C. Systems shall not be operated without properly installed filters. Filters used during construction shall be removed and replaced with new filters after construction is completed and the systems are ready for final acceptance by the owner.

3.05 EQUIPMENT

A. Equipment shall operate quietly and without objectionable vibration. Such problems, other than from equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated at the direction of the Architect.

B. Install equipment to provide a good appearance, easy access, and adequate space to allow replacement and maintenance. Provide bases, supports, anchor bolts, and other items required to achieve this. Installation shall be level, above moisture level, and adequately braced.

C. Extend ¼" schedule 40 black steel lubrication pipes from hard-to-reach locations to the front of equipment or to access doors. Terminate with proper lubrication fittings.

D. Move equipment into the building through available openings. Dismantle equipment where it is necessary to accomplish this. After reassembly, test equipment to verify its satisfactory operating condition.

E. Thoroughly lubricate equipment before operating. Repair of damage resulting from failure to comply with this requirement shall be the Contractor's responsibility.

F. Piping connections shall be secured and properly aligned, and all utility and control connections shall be properly isolated from the building structure using vibration isolators and flexible connections. Any equipment not meeting this requirement will be modified and properly reinstalled at no expense to the Owner.

3.06 ACCESS

A. All items that require access, such as for operating, cleaning, servicing, maintenance, and calibration shall be easily and safely accessible by persons standing at floor level, or standing on

permanent platforms, without the use of portable ladders. Examples of these items include but are not limited to all types of valves, filters, strainers, transmitters, and control devices. Prior to commencing installation work, refer conflicts between this requirement and the Contract Drawings to the Architect for resolution.

3.07 MECHANICAL SERVICES

A. Terminals and services weighing no more than 20 pounds, may be supported directly on the runners of a heavy-duty grid system but in addition, they must have a minimum of two #12-gauge slack safety wires attached at diagonally opposite corners and anchored to the structure above.

3.08 CONCRETE EQUIPMENT BASES

A. Concrete work that is part of the mechanical installations, as such is shown and/or detailed on the Drawings, shall conform to the requirements of the Concrete Section of these Specifications.

B. Concrete bases: Anchor equipment to a concrete base according to equipment details on mechanical and structural Drawings. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than the supported unit. Bases shall be neatly finished, have rounded corners, and have a smooth trowel finish.

3.09 PAINTING

A. Properly prepare work to be painted per the requirements of Division 09, except preservative and special painting as described herein. Priming shall conform to Division 09 requirements and be of a material compatible with paint for finish painting.

B. All equipment and materials shall be cleaned of grease, wax, oil, rust, or dirt in preparation for finish painting. Any prime coated surfaces showing signs of rust before being finish painted shall be thoroughly cleaned and a new prime coat applied.

C. Equipment in equipment rooms and like spaces shall be furnished with a factory-applied baked-on prime coat or at the Contractor's option, a standard factory baked enamel finish in approved colors. Machinery such as fans or motors shall be furnished with a factory-applied baked-on prime coat, or at the Contractor's option, a standard paint finish (air-dried or baked enamel) in approved colors. Mechanical equipment in other locations shall be furnished with a factory-applied baked-on prime coat unless noted otherwise.

D. Paint interior of ductwork at air outlets with one coat of flat black paint.

E. Prime paint both sides of flashings before installation.

F. Furnish can of touch-up paint with each factory-finished piece of equipment.

G. Paint all piping in mechanical rooms. Color as selected by the Architect.

H. Black steel piping exposed to the environment shall be painted with rust-inhibiting paint. Color as selected by Architect.

3.10 IDENTIFICATION OF SYSTEMS

A. Nameplates
   1. Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

B. Piping
   1. All piping shall be identified. Attach arrows at one or both ends of the marker to indicate flow direction.
   2. If the pipe being labeled contains multiple hazards, determine which has the greatest hazardous risk and label accordingly.
   3. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces, machine rooms, accessible maintenance spaces such as shafts, tunnels, and plenums, and exterior exposed locations as follows:
      a. Adjacent to all valves and flanges
      b. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at the branch.
      c. At both sides of wall or floor penetrations.
      d. Before and after all wall, floor, and ceiling penetrations and inaccessible enclosures.
      e. Adjacent to changes in direction.
      f. At access doors, manholes, and similar access points that permit view of concealed piping.
      g. Near major equipment items and other points of origination and termination.
      h. Spaced at maximum intervals of 25 feet along each run. Reduce intervals to 20 feet in mechanical rooms and other areas of congested piping and equipment, in spaces.
      i. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Ductwork
   1. Locate labels near points where ducts enter concealed spaces and at maximum intervals of 25 **feet** in each space where ducts are exposed or concealed by a removable ceiling system.
      a. Exposed ductwork shall be identified every 20 feet in mechanical rooms. with removable ceilings, and at each access door in spaces with hard ceilings.

D. Valves
   1. For identification and the Owner's maintenance records, all valves shall be numbered and identified with clearly stamped 1¼" diameter brass tags, in accordance with drawings and service performed.
   2. Control valves shall be also marked whether normally open (N.O.) or normally closed (N.S.).

E. Equipment
   1. All equipment shall be labeled with 1" high stencils showing the identifying mark noted on drawings and usage.
   2. Warning signs shall be placed on machines driven by electrical motors that are controlled by fully automatic starters, per California Code of Regulations, Title 8, Subchapter 7 - General Industry Safety Orders, Article 7, Section 3320.

F. A typewritten schedule of all nameplates and valve tags used, with identification, shall be framed and posted in mechanical rooms, at locations as directed.

3.11 SEISMIC RESTRAINT

A. Equipment:
   1. Each piece of equipment installed under these sections shall be constructed and anchored to structural supports as indicated on the Drawings.

B. Vibration
   1. All rotating mechanical equipment and associated piping and ductwork shall be mounted by vibration isolators as required to minimize transmission of vibrations and noise to building structures or spaces.

2. All rotating equipment shall be balanced both statically and dynamically.
3. To minimize alignment problems, all motors over 5 hp must be designed to be solidly attached to a common base with the driven unit.
4. To minimize vibration, solid sheaves, and band belts shall be designed to be used in multiple V-belt driven equipment over 15 hp.

C. Isolation of Equipment
1. Isolation shall be designed to be stable during starting and stopping of equipment without any transverse and eccentric movement of equipment that would damage or adversely affect the operation of the equipment or appurtenances.
2. Isolation shall be designed for the operating speed of the equipment.
3. Isolators, including springs, exposed to the weather shall be hot-dipped galvanized after fabrication. Hot dipped zinc coating shall comply with ASTM Method A-123 and shall not be less than 2 oz per square foot.
4. Isolators shall be selected and located to produce uniform loading and deflection even when equipment weight is not evenly distributed.
5. Isolation equipment includes neoprene pads, hanger spring and neoprene, travel limited floor spring and neoprene, inertia base, flexible duct connections, flexible pipe connections, thrust limits, grommets, and snubbers.

D. Seismic Control and Restraint
1. Brace or anchor mechanical equipment to resist horizontal forces acting in any direction using the latest editions of the CBC and ASCE.
2. Seismic-restraint devices shall meet CBC seismic restraint requirements, shall have horizontal and vertical load testing and analysis, and shall bear anchorage preapproval OPM number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

E. Ductwork:
1. All ductwork shall be supported in accordance with the recommendations and requirements of the SMACNA Duct Construction Standards, latest edition, except strap hangers and trapeze hangers, which shall have bracing capable of resisting a seismic force equal to 100% of the weight of the duct system in any direction. (Seismic force shall be in addition to static loading.)

F. Piping:
1. The flexibility of piping systems must be maintained by using flexible devices at critical points at junctions of separate building structures. Braces or anchors shall be designed to damp oscillations or check excessive movement. Flexible devices for piping of gas shall be loops or offsets. Flexible devices for other piping may be loops, Victaulic grooved, or roustabout couplings.
2. Piping at tops and bottoms of risers are critical points where flexibility is required, as well as at changes in direction on long runs of piping 4" and larger. Tops of risers shall be restrained from motion in a horizontal direction, and midpoints shall be anchored in all directions.

3.12 INSTALLATION - HANGERS AND SUPPORTS

A. Pipe supports shall be spaced according to CMC 2022, Table 313.3, and sufficiently close to support pipes properly without the formation of pockets. Hangers shall be installed at the ends of mains and branches.

B. Refrigerant piping shall be supported per CMC 1105.2 and 1109.6.

C. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

D. No valve or piece of equipment shall be used to support piping.

E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends, and similar units.

F. Install lateral bracing with pipe hangers and supports to prevent swaying.

G. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, 2-½ inches and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

H. Metal Pipe-hanger Installation: Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

I. Metal Trapeze Pipe-Hanger Installation: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.

J. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Insulated Piping:
   1. Attach clamps and spacers to piping.
      a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
      b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of the insert.

M. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

N. Ductwork
   1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
   2. Support vertical ducts with steel angles or the channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets. Support at each floor at maximum intervals of 16 feet.
   3. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.13 PIPE WELDING

A. All hot and chilled water, steam and steam condensate, compressed air, and vacuum piping shall be installed, examined, inspected, and tested in accordance with the requirements of ASME B31.9, Building Services Piping, current edition.

B. Before any welding is performed, the contractor shall submit to the Architect, copies of any welding procedure specifications and their supporting procedure qualification records for review

and acceptance. Copies of welder qualification records shall be made available for review to the owner or his representative at the construction site.

C. Weld all pipes 2.5 inches and larger. Use the following procedure. All welders must be AWS certified. AWS B2.1 SMAW 6G Pipe Welding Procedure Specifications

Welding process: SMAW	Grove Angle: 60 degrees
Position: 6G Fixed position	Material/Spec: A 106
Weld Progression: Up	Thickness (pipe/tube): Groove (in) .280
Backing: No	Notes: Sch. 40 Pipe
Current/Polarity: DCEP	Filler Metal Class: E6010Rt/E7018F1
Root Opening: 1/16 to 1/8	Other Filler Metal Class: Rt. 1/8, 3/32 Filler

D. Welded joints shall be beveled and butt-welded. Reductions of pipe shall be made with forged steel welding fittings. Branch reductions of 2 or more pipe sizes smaller than the main shall be Bonney "weldolet" fittings, or equal. Job fabricated reductions and branches shall not be used. All pipe burrs shall be reamed out. Welding rods shall be as follows, or approved equal:

Pipe Size	Arc Welding	Gas Welding
2" and larger	Fleetweld #5	Oxweld #1
1½" and smaller	None	Oxweld #1

3.14 INSTALLATION, PIPING

A. Installation of piping shall be such that damage cannot result through thermal expansion or contraction, to piping, building, or pipe hangers and supports. Anchors shall be installed at midpoints of all runs in the main piping for localizing pipe expansion or prevention of creepage.

B. Rough-in shall proceed as rapidly as general construction will permit. All rough-in shall be complete, at locations verified by Architect and Owner, and tested and inspected before installation of concrete, lath, plaster, gypsum wallboard, or other finishes.

C. All piping shall be concealed in finished rooms, installed in furred walls and partitions. Where furred or suspended ceilings occur, the piping shall be installed in the concealed space at points adjacent to beams and/or other structural members and coordinated with ductwork and equipment. Where exposed piping occurs, it shall be installed parallel to or at right angles to building walls, unless specifically shown otherwise on the Drawings.

D. All pipelines shall be installed free from traps and air pockets, true to line and grade, with suitable supports properly spaced. All piping shall be installed without undue stresses and with provision for expansion and contraction.

E. All piping shall be new and free from foreign substances. American standard pipe threads shall be used for IPS threaded work. Joints in threaded piping shall be made up with Teflon tape applied to the male threads only. No screwed pipe joints shall be caulked or packed with rope or other packing materials. Pipe shall be free from tool marks, threads cut accurately with not more than two threads showing beyond fitting. Friction wrenches shall not be used with plated, polished, or soft metal piping. All changes in pipe size shall be made with reducing fitting. Bushings will not be permitted.

F. Protect unattended openings in piping during construction.

G. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

H. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

J. Install piping to permit valve servicing.

K. Install piping free of sags and bends.

L. Install piping to allow application of insulation.

M. Install fittings for changes in direction and branch connections.

N. Install escutcheons for penetrations of walls, ceilings, and floors according to the following. Use one-piece escutcheons wherever possible in new construction. Split-casting units are acceptable for installation on existing piping systems. Provide chrome plated escutcheon plates at all points where exposed piping penetrates finished wall, ceilings, or floors.

O. No valve or piece of equipment shall be used to support piping.

P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.

Q. All copper tubing shall be formed in a workmanlike manner according to the Pipe and Tube Bending Handbook of the Copper and Brass Research Association. A tube bender giving support to the periphery of the tube shall be used. The tubing shall be protected against flatting or other injuries.

R. All copper connections and joints shall be made according to the Copper Tube Handbook, Copper and Brass Research Association. No swaged connections will be permitted. All valves, pumps, and similar equipment shall be connected to copper piping through union or flange adapter fittings.

S. Valves, cocks, etc., shall be installed to allow convenient accessibility and operation.

T. Unions and flanges shall be installed to allow convenient replacement of all equipment and cleaning tubes.

U. A union connection shall be installed downstream from all valves, at equipment connections, and at other locations as required or directed.

V. Shut-off valves shall be provided in all main services and where required to permit proper servicing of equipment. Valves of one type shall be of one manufacturer.

W. All valves shall be of the same size as the pipelines in which they are installed unless specifically sized on the Drawings. All hand-controlled line valves shall be ball valves, except where throttling control or frequent operation is required, in which case globe or angle valves shall be used. Globe valves in horizontal lines shall be installed with the stem horizontal to permit line draining. All globe and angle valves shall be installed to close against pressure. Disc valves shall have discs suitable for the services for which they are to be used.

X. All valves shall be accessible and shall not be installed with the stems below the horizontal plane. Provide access panels at walls, ceilings, or floors.

Y. Cutting or boring of joists or other structural members shall be done only when alternative routing is impossible and only upon written approval of the Architect or Owner.

3.15 CLEANING OF PIPING

A. All new piping shall be thoroughly cleaned of rust, scale, etc., before enclosing and placing in operation. Water shall be forced through pipes until the systems are free from foreign substances.

3.16 CLEANUP

A. Upon completion of the work, remove all material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION

SECTION 23 0593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Balancing Air Systems
   2. Additional Tests:
      a. Duct leakage testing

1.03 SCOPE

A. The Testing, Adjusting, & Balancing (T&B) Agency will provide the following services:
   1. Provide all supervision, personnel, instruments, calibration equipment, and all other materials necessary to perform balancing and testing, and compile test data including calculations and services necessary for the heating, ventilating, and air conditioning systems for this project, per the project Drawings and Specifications and as specified herein.
   2. The T&B Agency shall be responsible for inspecting, balancing, adjusting, testing, and logging the data of the performance of fans, all dampers in the duct systems, all air distribution devices or heat exchangers, and the flows of water through all coils.
   3. The T&B Agency shall balance, test, and adjust the systemic components to obtain optimum conditions in each conditioned space in the building. If construction deficiencies are encountered which preclude obtaining optimum conditions, the deficiencies will be recorded and given to the Owner's Representative. The T&B Agency is advised that deficiencies in the HVAC construction are often encountered during final T&B services and should include in the bid an amount deemed advisable to compensate for time in identifying the deficiencies.

B. During construction, the T&B Contractor shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of the HVAC systems. Inspections shall be conducted a minimum of three times. Typically, this is performed when 60% of the ductwork and piping are installed and again when 90% of the total system is installed and prior to insulation. A copy of the written report is to be issued to the Mechanical Engineer for review.

1.04 SUBMITTALS

A. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit T&B strategies and step-by-step procedures.

B. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists for use by systems installers in verifying system readiness for T&B.

C. Examination Report: Within 30 days of Contractor's Notice to Proceed, provide a summary report of any issues that are discovered that may preclude the proper testing and balancing of the systems.

D. Certified T&B reports: Within 30 days of completion of balancing work, submit AABC-certified T&B report.

.

1. Submit one copy of the final T&B Report directly to the Architect. Provide five additional copies to the Contractor.

1.05 QUALITY ASSURANCE

A. T&B Contractor Qualifications:
   1. General Contractor will employ a T&B Agency that is certified by the Associated Air Balancing Council (AABC). The T&B Agency will have experience in the field of air and hydronic system balancing, possess calibrated instruments, and employ qualified Supervisors and skilled Technicians to perform all required tests. The T&B Agency shall have a minimum of 10 years of experience in the Testing, Adjusting, and Balancing field.

B. T&B technician shall perform the following:
   1. Review field data reports to validate accuracy of data and to prepare certified T&B reports.
   2. Certify that the T&B team complied with the approved T&B plan and the procedures specified and referenced in this Specification.
   3. Certify the T&B report

C. T&B Conference: If requested by the Architect or Construction Manager after approval of the T&B Agency's submittals, meet to develop a mutual understanding of the details
   1. Agenda Items:
      a. The examination report.
      b. The Strategies and Procedures plan.
      c. Systems readiness checklists.
      d. Coordination and cooperation of trades and subcontractors.
      e. Coordination of documentation and communication flow.

D. Approved Test and Balance agencies in the area:

RS Analysis, Inc.
Corporate Office
1035 Suncast Lane, Suite 130
El Dorado Hills, CA 95762
(888) 330-1935
South San Francisco Branch (650) 583-9400
www.rsanalysis.com

National Air Balance Company, Inc.
4171 Business Center Drive
Fremont, CA 94538
(510) 623-7000
www.nabco.biz

Raglen System Balance, Inc.
(775) 747-0100 (main office)
www.raglensystembalance.com

Pacific Test & Balance, Inc.
4771 Mangels Blvd.
Fairfield, CA 94534
(707) 696-2444
www.pacifictab.com

E. T&B Report Forms: Use standard T&B contractor's forms.

F. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in "AABC National Standards for Total Systems Balance."

.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION & REVIEW

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper T&B of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Note the locations of devices that are not accessible for testing and balancing.

C. Review the Contractor shop drawing submittals for their effect on the test and balance process and overall performance of the HVAC system. Submit recommendations for enhancements or changes to the system.

D. Review location and type of volume damper inlet conditions to air terminals, air valves, and HVAC equipment.

E. Review location of pressure sensors in the air distribution system.

F. Review automatic control systems as they affect the test and balance procedure.

G. Review sheet metal and piping shop drawings to verify the installation of flow control devices.

H. Review the approved submittals for HVAC systems and equipment.

I. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas.

J. Review equipment performance data including fan and pump curves.

K. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, clean permanent filters are installed, and controls are ready for operation.

L. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected, configured by the Controls contractor and functioning.

M. Examine strainers to verify that Mechanical Contractor has replaced startup screens with permanent screens and that all strainers have been cleaned.

N. Examine two-way valves for proper installation and function.

O. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

P. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

3.02 PREPARATION

A. Prepare a T&B plan that includes:
   1. Equipment and systems to be tested.
   2. Strategies and step-by-step procedures for balancing the systems.
   3. Instrumentation to be used.
   4. Sample forms with specific identification for all equipment.

B. Prepare system-readiness checklists, as described in the *AABC National Standards for Total System Balance*, for use by contractors in verifying system readiness for T&B. These shall include, at a minimum:

.

1. Airside:
   a. All ductwork is complete with all terminals installed.
   b. All volume, smoke and fire dampers are open and functional.
   c. Clean filters are installed.
   d. All fans are operating, free of vibration, and rotating in correct direction.
   e. VFD start-up is complete and all safeties are verified.
   f. Automatic temperature-control systems are operational.
   g. Ceilings are installed.
   h. Windows and doors are installed.
   i. Suitable access to balancing devices and equipment is provided.

3.03 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for T&B procedures.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.04 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain approved submittals and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare single-line schematic diagram of systems for the purpose of identifying HVAC components.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check condensate drains for proper connections and functioning.

H. Check for proper sealing of air-handling-unit components.

3.05 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
   1. Measure total airflow.
      a. Set outside air, return air and relief air dampers for proper position that simulates minimum outdoor air conditions.
      b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
      c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
      d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

.

2. Measure fan static pressures as follows:
   a. Measure static pressure directly at the fan outlet or through the flexible connection.
   b. Measure static pressure directly at the fan inlet or through the flexible connection.
   c. Measure static pressure across each component that makes up the air-handling system.
   d. Report any artificial loading of filters at the time static pressures are measured.
3. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
   1. Measure airflow of submain and branch ducts.
   2. Adjust sub-main and branch duct volume dampers for specified airflow. Re-measure each sub-main and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.
   1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
   2. Measure airflow at all inlets and outlets.
   3. Adjust each inlet and outlet for specified airflow.
   4. Re-measure each inlet and outlet after all have been adjusted.

D. Verify final system conditions.
   1. Re-measure and confirm minimum outdoor air, return and relief airflows are within design. Readjust to design if necessary.
   2. Re-measure and confirm total airflow is within design.
   3. Re-measure all final fan operating data, rpms, volts, amps, static profile.
   4. Mark all final settings.
   5. Test system in economizer mode. Verify proper operation and adjust, if necessary.
   6. Measure and record all operating data.

E. Record final fan-performance data

3.06 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Adjust the variable-air-volume systems as follows:
   1. Verify that the system static pressure sensor is located 2/3 of the distance down the duct from the fan discharge.
   2. Verify that the system is under static pressure control.
   3. Select the terminal unit that is most critical to the supply-fan airflow. Measure inlet static pressure and adjust system static pressure control setpoint so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
   4. Calibrate and balance each terminal unit for maximum and minimum design airflow as follows
      a. Adjust controls so that terminal is calling for maximum airflow (note some controllers require starting with minimum airflow. Verify calibration procedure for specific project).
      b. Measure airflow and adjust calibration factor as required for design maximum airflow. Record calibration factor.
      c. When maximum airflow is correct, balance the air outlets downstream from terminal units.
      d. Adjust controls so that terminal is calling for minimum airflow.

.

e. Measure airflow and adjust calibration factor as required for design minimum airflow. Record calibration factor. If no minimum calibration is available, note any deviation from design airflow.
f. When in full cooling or full heating, ensure that there is no mixing of hot deck and cold deck airstreams unless so designed.
g. On constant volume terminals, in critical areas where room pressure is to be maintained, verify that the airflow remains constant over the full range of full cooling to full heating. Note any deviation from design airflow or room pressure.

5. After all terminals have been calibrated and balanced, test and adjust system for total airflow. Adjust fans to deliver total design airflows within the maximum allowable fan speed listed by fan manufacturer.
   a. Set outside air, return air and relief air dampers for proper position that simulates minimum outdoor air conditions.
   b. Set terminals for maximum airflow. If system design includes diversity, adjust terminals for maximum and minimum airflow so that connected total matches fan selection and simulates actual load in the building.
   c. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
   d. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
   e. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
6. Measure fan static pressures as follows:
   a. Measure static pressure directly at the fan outlet or through the flexible connection.
   b. Measure static pressure directly at the fan inlet or through the flexible connection.
   c. Measure static pressure across each component that makes up the air-handling system.
   d. Report any artificial loading of filters at the time static pressures are measured.
7. Set final return and outside airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
   a. Balance the return-air ducts and inlets the same as described for constant-volume air systems.
   b. Verify all terminal units are meeting design airflow under system maximum flow.
8. Re-measure the inlet static pressure at the most critical terminal unit and adjust the system static pressure setpoint to the most energy-efficient setpoint to maintain the optimum system static pressure. Record setpoint and give to controls contractor.
9. Verify final system conditions as follows:
   a. Re-measure and confirm minimum outdoor air, return and relief airflows are within design. Readjust to design if necessary.
   b. Re-measure and confirm total airflow is within design.
   c. Re-measure all final fan operating data, rpms, volts, amps, static profile.
   d. Mark all final settings.
   e. Test system in economizer mode. Verify proper operation and adjust, if necessary. Measure and record all operating data.
   f. Verify tracking between supply and return fans.

3.07 TOLERANCES

A. Set HVAC system's air flow rates within the following tolerances:
   1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
   2. Air Outlets and Inlets: Plus or minus 10 percent.
   3. Minimum Outside Air: Zero to plus 10 percent.

.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.08 ADDITIONAL TESTS

A. Duct Leakage Test
   1. All ductwork shall be tested for leaks, using necessary instruments before insulating any ductwork. Conduct test as follows and as recommended in SMACNA Balancing Manual.
      a. Seal all openings in duct section and plenum to be tested.
      b. Connect test apparatus to test section of cuts, using a flexible duct connection or hose (fitting provided by Mechanical Contractor).
      c. Close damper on blower suction side, to prevent excessive build-up of pressure.
      d. Start blower and gradually open damper on suction side of blower.
      e. Determine amount of air leakage and make repairs as required.
      f. Leakage factor allowable shall be 5% based on the total operating cfm of the section of duct under testing.
      g. Tested sections of ductwork shall be visually marked with certification sticker and initials of field test inspector. Tests shall be made before duct sections are concealed.
   2. Witness the duct pressure testing performed by the mechanical/installing contractor.
   3. Verify that proper test methods are used and that leakage rates are within specified tolerances.
   4. Report any deficiencies observed.

3.09 FINAL TEST AND BALANCE REPORT

A. The report shall be a complete record of the HVAC system performance, including conditions of operation, items outstanding, and any deviations found during the T&B process. The final report also provides a reference of actual operating conditions for the owner and/or operations personnel. All measurements and test results that appear in the reports must be made on site and dated by the AABC technicians or test and balance engineers.

B. The report must be organized by systems and shall include the following information as a minimum:
   1. Title Page:
      a. AABC certified company name
      b. Company address
      c. Company telephone number
      d. Project identification number
      e. Location
      f. Project Architect
      g. Project Engineer
      h. Project Contractor
      i. Project number
      j. Date of report
      k. AABC Certification Statement
      l. Name, signature, and certification number of AABC TBE
   2. Table of Contents.
   3. AABC National Performance Guaranty.
   4. Report Summary:
      a. The summary shall include a list of items that do not meet design tolerances, with information that may be considered in resolving deficiencies.
   5. Instrument List:
      a. Type.
      b. Manufacturer.
      c. Model.

.

d. Serial Number.
e. Calibration Date.

6. T&B Data:
   a. Provide test data for specific systems and equipment as required by the most recent edition of the "AABC National Standards."
7. Print or sketch, reduced in size, showing all supply, return and exhaust air outlets for easy reference to report data.

C. One copy of the final test and balance report shall be sent directly to the Mechanical Engineer of record. Provide five additional copies to the contractor.

D. An approved copy of the balancing report shall be included in the maintenance manual submittal.

3.10 FINAL ACCEPTANCE

A. At the time of final inspection, the T&B Agency shall recheck, in the presence of the Owner's Representative, specific and random selections of data and air quantities recorded in the Certified Report.

B. Points and areas for recheck shall be selected by the Owner's Representative.

C. Measurement and test procedures shall be the same as approved for work forming basis of Certified Report.

D. Selections for recheck, specific plus random, will not normally exceed 25% of the total number tabulated in the report, except that special air systems may require a complete recheck for safety reasons.

E. If random tests elicit a measured flow deviation of 10% or more from that recorded in the Certified Report listings, by 10% or more of the selected recheck stations, the report shall be automatically rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, new Certified Report submitted, and new inspection tests made, all at no additional cost to the Owner.

F. Following final acceptance of the Certified Report by the Owner's Representative the settings of all valves, splitters, dampers, and other adjustment devices shall be permanently marked by the T&B Agency, so that adjustment can be restored if disturbed at any time. Devices shall not be marked until after final acceptance.

END OF SECTION

.

SECTION 23 0900

CONTROLS FOR HVAC

PART 1 GENERAL

1.01 SUMMARY

A. Section includes equipment and performance criteria for furnishing all labor and materials for the installation and programming for climate management control for HVAC systems, utilizing wireless communication with cloud-based servers.

B. Related Sections
1. Section 23 0500 – General Mechanical
2. Section 23 0000 – Heating, Ventilating, Air-Conditioning
3. Section 23 0593 – Testing, Adjusting and Balancing for HVAC
4. Section 26 0500 – Basic Electrical Requirements
5. Section 26 2700 – Basic Electrical Materials and Methods

1.02 SCOPE OF WORK

A. Except where otherwise noted, the system shall consist of a network of commercial internet-programmable thermostats, their accessories, and any other networked climate management device(s) required to fill the intent of the Specifications, and a sequence of operations. A complete and operable system shall be provided.

B. The Controls Contractor shall review and study existing building site conditions, where applicable, and all new construction Drawings for the project, including HVAC Drawings and the entire project Specifications, to familiarize themselves with the equipment and system operation prior to bidding and submittal of a bid/price. The Owner shall be notified immediately of any conflicts between the project and the scope of work of this Section, including work to be completed by others.

C. All equipment and installation of control devices associated with the HVAC equipment indicated on the Drawings shall be provided by the Controls Contractor.

D. When the energy management system is fully installed and operational, the Controls Contractor will make themself available to meet with the designated representatives of the Owner to review the as-installed condition of the system. At that time, the Controls Contractor shall demonstrate the operation of the system and prove that it complies with the intent of the Drawings and Specifications.

E. The Controls Contractor shall furnish and install a complete energy management control system, including all necessary hardware and all operating and applications software necessary to perform the control sequence of operations as called for.

F. Provide and install energy management controls for the HVAC equipment as noted on the Drawings.

G. Provide technical support necessary for commissioning of system in coordination with the HVAC Contractor, Balancing Contractor, and the Owner's team.

H. The Controls Contractor shall provide one training session in the operation of the system for the Owner's personnel.

I. All work performed under this Section shall be in compliance with all codes and regulations as mandated by the authority having jurisdiction.

1.03 CONTROL SYSTEM DESCRIPTIONS

A. The energy management controls system shall be as indicated on the Drawings and described herein. System shall include a network of commercial internet-programmable thermostats, their accessories, and any other networked devices required for complete climate management. Devices shall communicate across a wireless network using IEEE 802.15.4 technical standards. Wireless communication shall be of an automated mesh communication type, which self-establishes network addresses, communication routes, and all other setup requirements to establish connection across the entire campus. A single ethernet-connected gateway shall be able to connect the wireless mesh network to the internet, allowing for climate management through a cloud-based web-application. This network design is to be used to isolate the controls system from the owner's private ethernet network (LAN) and/or WiFi networks. IEEE 802.11 or any other wireless standard of communication or a wired network communication protocol between devices is not acceptable by these energy management system specifications. The gateway is to connect to a single outbound ethernet connection on the owner's wide area network (WAN) over a TCP/IP connection. The owner's firewall shall not require any inbound port assignments for the gateway to connect to the cloud servers. The gateway shall not require a public IP and it shall not run any standard available operating systems, such as Windows or Linux.

B. Access and control of the HVAC controls system shall be through a web-based graphical management platform. The controls platform shall sit on a cloud server and be accessible on both local personal computers and remotely by use of a web-browser that supports HTML5 or later.

C. No on-site servers are to be installed or used for the controls system. No licensing fees or future licensing fees shall be required as part of the controls system. These Specifications and guidelines are to create a cohesive and secure network that provides full management over the facility's climate through the cloud controls system.

D. The controls system shall accommodate an unlimited simultaneous multiple-user operation. Access to the controls system shall be limited based on security permissions of each operator's role, managed by Owner site administrators.

1.04 APPROVED CONTROL SYSTEM MANUFACTURERS

A. Pelican Wireless Systems

1.05 SUBMITTALS

A. Shop drawings and product data in accordance with Division 01 Sections, the General Conditions, Supplemental Conditions, and the following.
   1. Shop drawings and manufacturer's standard product specification data sheets on all hardware and software products shall be provided for this project. No work may begin on any segment of this project until the Architect has reviewed submittals for conformity with the plan and specifications.
   2. All submittals shall be bound in a three-ring binder or provided digitally on a USB stick, with a table of contents and related section tabs. Five (5) copies shall be submitted to the Architect for distribution and review.
   3. Shop drawings shall be prepared in Auto CAD 2014 or newer and shall include basic floor plans depicting locations of all equipment and wiring (installed by others) to be controlled by system and locations of thermostats, gateways, and other equipment provided under this Section. Drawings shall also show location of electrical power, low voltage wiring, and data ports, which are provided by others, and required for proper installation of systems of this Section.

4. Submit submittal data and shop drawings to the Architect for review prior to ordering or fabrication of the equipment. The Contractor, prior to submitting, shall check all documents for accuracy.
5. The Architect will note corrections, if required, and return to the Contractor. The Contractor will then resubmit with the corrected or additional data. This procedure shall be repeated until all corrections are made to the satisfaction of the Architect and the submittals are fully approved.

1.06 CODES AND STANDARDS

A. Codes and Standards. Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this Section.
   1. California 2022 Title 24 Compliant
   2. California Energy Commission Occupant Control Smart Thermostat (OCST) certified.
   3. Open ADR 2.0 certified

B. All wiring shall conform to the National Electrical Code.

1.07 TRAINING

A. The Controls Contractor shall provide training for 2 owner representatives and/or maintenance personnel. The Controls Contractor shall provide on-site training to the District's representative(s) and maintenance personnel per the following description:
   1. On-site training shall consist of a minimum of 1 hour of hands-on instruction geared at the operation and maintenance of the systems. The curriculum shall include:
      a. System overview
      b. System application and operation
      c. System access
      d. Application features overview
      e. Changing set points and other attributes
      f. Scheduling
      g. Editing configurable and programmed variables
      h. Displaying color graphics
      i. Viewing historical reports
      j. Operational sequences including start-up, shutdown, adjusting, and balancing
      k. Equipment maintenance

1.08 OPERATING AND MAINTENANCE MANUALS

A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire BAS.

B. Following project completion and testing, the Controls Contractor shall submit as-built documentation reflecting the exact installation of the system.

1.09 WARRANTY

A. The Controls Contractor shall warrant the system for 12 months after system acceptance and beneficial use by the Owner. During the warranty period, the Controls Contractor shall be responsible for all necessary revisions required to provide a complete and workable system, consistent with the letter and intent of the sequence of operations. HVAC controls equipment shall include a limited warranty by the manufacturer for a period of 5 years from the time of system acceptance.

B. Limited warranty by manufacturer is limited to replacement of defective products.

1.10 WORK BY OTHERS

A. The Controls Contractor shall coordinate with other Contractors prior to performing the work on this project and cooperate as necessary to achieve a complete and neat installation. To that end, each Contractor shall consult the Drawings and Specifications for all trades to determine the nature and extent of others' work prior to fabrication and installation. The Owner's Representative shall be immediately notified if an area of conflict occurs between trades prior to fabrication and installation. Controls Contractor shall provide field supervision to the Mechanical Contractor for pre-installation of control components.

B. Low-voltage thermostat wiring between equipment and thermostat locations shall be furnished and installed by others. Unless otherwise noted, all new low-voltage wiring shall be multiple conductor thermostat wiring (wire count as indicated in thermostat manufacturer's installation instructions) installed per Owner's specifications. (Wiring in existing installations shall be minimum 3 conductor/18-gauge wires, per controls manufacturer's standard specifications, multiple conductor/18-gauge thermostat wiring preferred. See installation instructions for specific conductor counts depending on heating and cooling modes of existing equipment.)

C. Related work provided by others:
   1. 110V outlets shall be provided within 5 feet of each gateway or wireless repeater location.
   2. 1 ethernet data port shall be provided within 10 feet of each gateway location.

D. Equipment start-up and servicing.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Unless otherwise noted, all products shall be of a single manufacturer. The standard of design and quality shall be products manufactured by Pelican Wireless Systems.

2.02 COMMUNICATION

A. This project shall be comprised of a network of devices that use an IEEE 802.15.4 self-creating and self-healing wireless mesh communication network to reach an ethernet gateway.

B. The gateway shall communicate to cloud servers via a single ethernet connection at the Owner's wide area network (WAN) over a TCP/IP connection. The facility's firewall shall not require any inbound port assignments for the gateway to connect to the cloud servers. The gateway shall not require a public IP.

C. No BACnet, ModBus, LON, or any other device-to-device wired communication protocol shall be used in the communication network.

2.03 OPERATOR INTERFACE

A. The controls system shall be controlled, managed, and configured using a web-app on any personal computer, smartphone, and/or tablet that runs a browser with HTML5 or newer.

B. The web-app platform shall run on cloud servers that allow for virtual access. The platform shall not run on a local on-site server.

C. The web-app shall support, at a minimum, the following functions:
   1. Personal user log-on identifications (email addresses) and unique passwords shall be required.
   2. Custom HTML programming shall not be required to display any graphics, data, or build the web-app. There shall be no development cost, commissioning costs, or software upgrade cost required to obtain and use the web-app.

3. Storage of historical data shall reside on the cloud server and shall not sit within the client's computer, internal network, or other devices. A controls system that requires on-site data storage is not acceptable.
4. System shall allow for administrator and user defined access privileges.
5. A push/pull open API interface with XML data output shall be available.
6. Servers shall not run Windows operating system.

D. Control and Override
1. The controls system shall provide view, override, and edit of the status of any object and property in the system. The status of the device shall be defined graphically and shall not require any custom programs or programming.
2. Temporary Overrides. The controls system shall be able to provide temporary override (wherever an override is allowed) and automatically remove the override after a specified period.
3. Any override and edit of an object virtually or at the device, if allowable, shall be historically tracked.

E. Scheduling
1. The controls system shall provide users with scheduling of application devices through a graphical interface. Scheduling shall include, but is not limited to:
   a. Occupied/Unoccupied Schedules. Shall allow 12 scheduled set-time changes in a single day, be configurable for daily, weekly, and weekday/weekend layouts, and shall be able to be unique to individual devices or easily shared between multiple devices, where applicable.
   b. Event Schedules. Shall allow for advanced one-time or repeating event type schedules. Event schedules shall override occupied/unoccupied schedules. After the event schedule ends, the device shall revert to the occupied / unoccupied schedule automatically.
   c. Vacation Schedules. A 360-day calendar shall provide override of schedules during vacation days. Thermostats shall be able to automatically or be manually switched to follow vacation schedules instead of occupied/unoccupied schedules.

F. Alarm Notification
1. Alarm notification(s) shall be generated if there are failures detected by devices part of the controls system. These failures shall be, but are not limited to temperature deviations, temperatures missing targets, temperatures too high or too low, failures of equipment, etc. Alarm notification(s) shall be posted on the controls system and shall be able to be sent either via email or text message to an unlimited number of users.

G. Reports and Logs
1. Data shall be logged and stored on cloud servers for all devices that are part of the controls system, in real-time. Every device real-time "state change", when applicable, shall be stored and viewable for at least 1 week, with the option of up to 2 years.
   a. Each space temperature
   b. Each temperature set point(s)
   c. Each current call: heat, cool, number of stages, fan, economizer, etc.
   d. Each damper position
   e. Each valve position
   f. Each CO^2 change
   g. Each CO^2 setting
   h. Each current call for ventilation due to high CO^2
   i. Each humidity change
   j. Each humidity set point
   k. Each current call for dehumidification or humidification.

l. Each fan speed adjustment
m. Supply duct static pressure
n. Supply, return, outside air temperatures

2. Data shall be represented on historical graphs that allow for easy viewing of device state change at different times.
3. Excel outputs shall not be required to view data. Historical data shall be viewable through the controls system.

2.04 APPLICATION-SPECIFIC CONTROLLERS

A. Application specific controllers shall not require custom programming and shall control specific equipment through simple configuration settings done through the cloud-based controls system. All configuration changes shall automatically upload into the device once set on the controls system and shall be stored by the device's internal memory.

B. Gateways are devices that connect to an ethernet port and act as a bridge between the controls system cloud servers and the wireless mesh network.
1. Shall be capable of providing internet connection to up to 2,000 devices.
2. Shall be capable of automatically addressing routing tables to all devices part of wireless mesh network and shall not require manual programming or addressing.
3. Shall communicate to cloud servers over a TCP/IP outbound-only connection.
4. Shall not require a public IP address, custom VPNs, or any on-site servers.
5. Shall communicate to other controls system devices over the dedicated and isolated 802.15.4 IEEE technical standard.
6. Shall be secured using AES (Advanced Encryption Standards).

C. Internet-enabled thermostats are controllers that detect a space/zone temperature and operate equipment or dampers that supply heating, cooling, ventilation, or a combination of the 3 mechanical states, to their space/zone. Examples are thermostats for VAV, VVT, fan-powered boxes, fan coil, blower coils, unit ventilators, heat pumps, water source heat pumps, and conventional DX and/or gas heat equipment.

D. Provide Pelican thermostat TC1, thermostat only, or TC3, thermostat and carbon dioxide sensor, shall be provided on all school projects. Provide with clear plastic thermostat lockbox cover. Honeywell Home or equal.

E. Internet-enabled thermostats:
1. Shall be capable of providing 24VAC outputs that can be configured to provide control of the following: 2 stages of fan, 3 stages of cooling, 2 stages of heating, 1 stage of auxiliary heat (heat pumps), floating point zone dampers, 2-position zone dampers, floating point zone reheat valves, and 2-position zone reheat valves.
2. Shall include a removable wiring terminal module that allows for thermostat installation, even in situations where there are only 3 wires between equipment and where the thermostat is to be installed.
3. Shall be available with the following internal sensors: temperature only, temperature and humidity, temperature, humidity, CO^2, and temperature and CO^2. All sensors required by the Specifications are to be internal to the thermostat and not require 2 devices on the wall.
4. Shall be able to accept expansion accessories that allow for more advanced control sequences and additional temperature detection. Examples are economizer controllers, outside air ventilation control, supply air temperature detection, unit ventilator face/bypass control, and modulating control. All expansion accessories shall be internet enabled and accessible through controls system.
5. Shall communicate with the wireless mesh network through an internal wireless antenna that runs on the 802.15.4 technical standards.

6. Shall be able to automatically repeat the wireless mesh network to additional devices part of the controls system.
7. Shall automatically push, in real-time, to the controls system all "state changes" so as to be viewable historically and in real-time from the controls system. Examples are changes in equipment operation (heat, cool, fan), number of stages active, the temperatures in the space, damper position, valve position, temperature set-points, etc.
8. Shall be able to lock-out heat pump compressor(s) based on outside air temperature.
9. Shall provide set-point (heat & cool) temperature limitations through the controls system.
10. Shall provide full local keypad lock-out from the controls system.
11. Shall meet California 2022 Title 24 code standards.
12. Shall have a programmable 3° F heat/cool temperature range that auto-adjusts to a 5° F dead band.
13. Shall have both a heat setpoint, cool setpoint, and auto-changeover.
14. Shall have optimum start algorithms that will calculate start times based on at least 7 days of previous run-time temperature and rate-of-change historical data for its space. Optimum start algorithm shall recalculate each optimized schedule time before each optimized schedule.
15. Shall be able to be manually overridden through the controls system.
16. Shall be configured through the controls system.

F. Wired temperature inputs are to be available to provide external temperature detection for specific controls system devices. Examples are to provide supply air temperature, water temperature, refrigeration temperature, outside air temperature, etc. to a thermostat or other device.
1. Shall accept 10K type II thermistors.
2. Shall push to the controls system real-time temperature changes so as to be viewable historically and in real-time from the controls system.
3. Shall accept a thermistor at a maximum of up to 100 feet from input terminal.
4. Shall be configured through the controls system.

G. Internet-enabled economizer controllers are controllers that modulate an outside air damper to provide ventilation and economization to a single zone.
1. Shall only require a dry-bulb outside air temperature sensor and dry-bulb supply air temperature sensor. No dry-bulb return air temperature sensor or dry-bulb mixing box temperature sensor shall be required to meet full economizer functionality to at a minimum California 2022 Title 24 standards.
2. Shall communicate with thermostat to determine space temperature and space temperature setpoint, in order to decide when economization can be used.
3. Shall continue to economize as its only source of cooling as long as the outside air temperature is able to keep the space temperature within 1°F of the cool temperature setpoint.
4. Shall be able to enable mechanical cooling at the same time as economization.
5. Shall be able to prevent the supply air temperature from dropping below a minimum temperature.
6. Shall provide enthalpy by use of pulling humidity and barometric pressure information from the internet, based on the zip code of installation location. Enthalpy shall not require any additional probes other than the dry-bulb probe and shall be free to enable.
7. If connected to a CO^2 thermostat, shall be able to provide demand ventilation control of outside air damper.
8. Shall have a minimum ventilation damper position and a maximum ventilation damper position.
9. Shall be able to be scheduled to not open the outside air damper for ventilation during unoccupied hours.

10. Shall be able to control a variable frequency drive (VFD) with up to 5 fan speed inputs. Example of fan speed changes are during ventilation, stage 1 cooling, stage 2 cooling, stage 1 heating, stage 2 heating.
11. Shall modulate an outside air damper by use of a 0-10VDC signal.
12. Shall accept a 0-10VDC signal feedback input from the outside air damper actuator to confirm outside air damper is working correctly.
13. Shall meet all California 2022 Title 24 codes, including fault detection and diagnostic requirements.
14. Shall send fault detection and diagnostic information to the controls system.
15. Shall accept a minimum of three 10K type II thermistors.
16. Shall be able to modulate a 0-10VDC hot water, steam, or electric SCR for heating and outside air tempering.
17. Shall be able to modulate a 0-10VDC chilled water or modulating DX for cooling and outside air tempering.
18. Shall be able to control a face/bypass damper.
19. Shall push all "state changes" to the controls system as to be viewable historically and in real-time from controls system. Examples are changes in equipment operation (heat, cool, fan, economization, ventilation), number of stages active, the supply air temperature, the return air temperature, hot water valve position, face/bypass damper position, variable speed fan setting, etc.
20. Shall be able to be manually overridden through the controls system.
21. Shall be configured through the controls system.

H. Internet-enabled power relay modules are controllers that have dry-contact relays able to start/stop different electrical equipment. Examples are exhaust fans, lights, pumps, valves, boilers, chillers, etc.
1. Shall have relays with a max rating of 120 VAC @ 15 AMPs or 240/277 VAC @ 10 AMPs.
2. Shall have a low-voltage terminal for momentary contact override inputs. Override time shall be configurable for a specific number of minutes through a configuration from the controls system.
3. Shall be able to provide lead/lag sequencing between relays.
4. Shall be able to accept an external dry-contact input used to verify flow, if being used as a pump controller. If being used as a lead/lag pump controller, shall be able to alarm the C if flow is not detected when Pump A is enabled and start Pump B as a stand-by pump.
5. Shall communicate with the wireless mesh network through an external wireless antenna that runs on the 802.15.4 technical standards. Antenna shall be able to communicate with power relay module over (3) 18-gauge wires up to 500 feet between device terminal inputs.
6. Shall be able to automatically repeat the wireless mesh network to additional devices part of the controls system.
7. Shall push all "state changes" to the controls system as to be viewable historically and in real-time from the controls system. Examples are changes in relay positions On or Off.
8. Shall be able to be manually overridden through the controls system.
9. Shall be configured through the controls system.

I. Zone controllers are controllers that operate equipment that supplies heating, cooling and ventilation, or a combination of these mechanical states, to multiple zones.
1. Shall communicate with the wireless mesh network through a removable wireless antenna that runs on the 802.15.4 technical standards.
2. Remote mountable antenna shall be able to communicate to zone controller over (3) 18-gauge wires up to 500 feet between devices terminal inputs.
3. Communication from the zone controller to all zone/space thermostats shall be over the wireless mesh network.

4. Shall be capable of providing 24VAC outputs that can be configured to provide control of the following: multiple stages of fan, multiple stages of cooling, and multiple stages of heating.
5. Shall be capable of providing 0-10VDC outputs that can be configured to provide control of the following: variable speed fan (VFD), modulating outside air damper, modulating heating valve.
6. Shall have integrated outside air damper control logic and not require third-party or additional controllers to provide economization and ventilation control.
7. Shall directly accept a supply duct static pressure probe. Shall have an integrated short-term and long-term learning PID loop algorithm for maintaining target supply static configurations. PID loop shall not require any type of cost for programming and is to be factory loaded into controller.
8. Shall only require dry-bulb outside, return, and supply air temperature sensors.
9. If communicating to CO^2 thermostat(s), shall be able to provide demand ventilation control of outside air damper.
10. Shall push all "state changes" to the controls system as to be viewable historically and in real-time from the BAS. Examples are changes in equipment operation (heat, cool, fan, economization, ventilation), number of stages active, the supply air temperature, the return air temperature, the outside air temperature, hot water valve position, supply duct static reading, variable speed fan setting, etc.
11. Shall be able to be manually overridden through the controls system.
12. Shall be configured through the controls system.

J. Make-up air controllers that operate equipment supplying ventilation to the building.
1. Shall communicate with the wireless mesh network through a removable wireless antenna that runs on the 802.15.4 technical standards.
2. Remote mountable antenna shall be able to communicate to controller over (3) 18-gauge wires up to 500 feet between devices terminal inputs.
3. Communication from the controller to zone/space thermostat(s) shall be over the wireless mesh network.
4. Shall be capable of providing 24VAC outputs that can be configured to provide control of the following: multiple stages of fan, multiple stages of cooling, and multiple stages of heating.
5. Shall be capable of providing 0-10VDC outputs that can be configured to provide control of the following: modulating variable speed fan (VFD), modulating outside air damper, modulating heating, modulating cooling.
6. Shall be able to modulate a VFD to maintain a targeted building static pressure.
7. Shall be able to modulate a 0-10VDC hot water, steam, or electric SCR for heating and outside air tempering.
8. Shall be able to modulate a 0-10VDC chilled water or modulating DX for cooling and outside air tempering.
9. Shall have integrated outside air damper control logic.
10. Shall directly accept a building pressure probe. Shall have an integrated short-term and long-term learning PID loop algorithm for maintaining target building pressure. PID loop shall not require any type of cost for programming and is to be factory loaded into controller and updatable virtually through EMS.
11. Shall only require dry-bulb outside and supply air temperature sensors.
12. If communicating to CO^2 thermostat(s), shall be able to provide demand ventilation control of outside air damper.
13. Shall push all "state changes" to the controls system as to be viewable historically and in real-time from the controls system. Examples are changes in equipment operation (heat, cool, fan, economization, ventilation), number of stages active, the supply air temperature,

the return air temperature, the outside air temperature, hot water valve position, supply duct static reading, variable speed fan setting, etc.

14. Shall be scheduled On or Off through the controls system.
15. Shall be able to be manually overridden through the controls system.
16. Shall be configured through the controls system.

K. Wireless proximity sensors are thermostat accessories that can detect when a door or window is opened or closed or be able to accept a dry-contact input from an occupancy sensor.
   1. Shall be able to communicate to a single internet-programmable thermostat over wireless mesh network.
   2. Shall communicate with the wireless mesh network through an internal wireless antenna that runs on the 802.15.4 technical standards.
   3. Shall run on two AA batteries and not require any unique type of battery to operate.
   4. Shall push all "state changes" to the controls system as to be viewable historically and in real-time from the controls system. Examples are if the door is open, if the space is unoccupied, if a window is open.
   5. Shall be configured through the controls system.

L. Remote wireless sensors are thermostat accessories that are used to either average temperatures between the sensor's location and a master thermostat or to relocate the sensing location of the master thermostat without having to run new wire.
   1. Shall be able to communicate to a single internet-programmable thermostat over wireless mesh network.
   2. Shall communicate with the wireless mesh network through an internal wireless antenna that runs on the 802.15.4 technical standards.
   3. Shall run on two AA batteries and not require any unique type of battery to operate.
   4. Shall push all "state changes" to the BAS to be viewable historically and in real-time from the BAS. Examples are changes in equipment operation (heat, cool, fan), number of stages active, the temperatures in the space, temperature set-points, etc.
   5. Shall be configured through the controls system.

M. Wireless repeaters are devices that extend the 802.15.4 wireless mesh network across large expanses or where controls system devices are unable to repeat the wireless mesh network on their own. Examples are when bridging the wireless mesh network from one building to another. Pelican WR900 long range dual band wireless repeater shall be provided.
   1. Shall communicate with the wireless mesh network through an internal wireless antenna.
   2. Shall be able to automatically repeat the wireless mesh network to additional devices part of the controls system.
   3. Shall not require an ethernet connection or any TCP/IP connection.

N. Configuration of devices and system
   1. To meet the sequence of operations for each controller, the controller shall be configured through the controls system by the installing Contractor. No custom programming or downloading by use of a service tool shall be required.
   2. Stand-alone operation: Each piece of equipment specified shall provide stand-alone operation. Controls system devices shall not require web connection or communication to the BAS to run under normal operations.

PART 3 EXECUTION

3.01 EXAMINATION

A. The Contract Documents shall be thoroughly examined for coordination of control devices, their installation, wiring, and commissioning. Coordinate and review mechanical equipment

specifications, locations, and identify any discrepancies, conflicts, or omissions that shall be reported to the Architect for resolution before rough-in work is started.

B. The controls system manufacturer shall be available to help the Controls Contractor in order to verify that control equipment can be installed as required, and any discrepancies, conflicts, or omissions shall be reported to the Architect for resolution before rough-in work is started.

3.02 PROTECTION

A. The Controls Contractor shall protect all work and material from damage by their work or personnel and shall be liable for all damage thus caused.

B. The BAS installing Contractor shall be responsible for their work and equipment until final inspection, testing, and acceptance. The Controls Contractor shall protect their work against theft or damage and shall carefully store material and equipment received on site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

C. Installation of controls system shall be performed by an approved Contractor. Approved Contractor is one who either has installed the controls system before or has been approved by the controls system manufacturer. The Contractor shall certify all work as proper and complete. Under no circumstance shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a Subcontractor unless that Subcontractor meets the controls system approved Contractor requirements as stated above.

D. Demolition: Remove controls that do not remain as part of the controls system. The Owner shall inform the Contractor of any equipment that is to be removed that will remain the property of the Owner. All other equipment that is removed will be disposed of by the Contractor.

E. Access to site: Unless notified otherwise, entrance to the building is restricted. No one will be permitted to enter the building unless their names have been cleared with the Owner or an Owner-approved representative.

F. Code compliance: All wiring shall be installed in accordance with all applicable electrical codes and shall comply with the equipment manufacturer's recommendations.

G. Clean up: During installation, the Contractor shall maintain a clean environment. At the completion of the work, all equipment pertinent to this Contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this Contract.

3.03 TEST AND BALANCE

A. Testing of controls shall be performed by installing Contractor. All equipment and components being controlled shall be tested, including, but not limited to: heating enables and a proper supply air temperature from the AHU, RTU, and into the zone (if there is a zone box) is recorded, cooling enables and a proper supply air temperature from the AHU, RTU, and into the zone (if there is a zone box) is recorded, fan enables and the proper fan speed is set when specified (when using a multiple speed fan, VFD, or ECM motor), and that the outside air damper fully opens and closes when commanded. Any devices that are enabled and disabled shall properly respond to the controls system control signals.

B. All control configurations shall be set to meet specifications. All temperatures and other sensors shall be determined accurate and configured for the type of temperature being detected.

C. All mechanical systems controlled by the controls system shall be properly balanced to the right CFMs to meet required codes and specifications.

3.04 WIRING, CONDUIT, AND CABLE

A. All control wires between mechanical equipment and control system devices are to be furnished and installed by others unless the Controls Contractor is responsible for this part of the installation. The Controls Contractor shall not begin work on this contract until all wiring is installed to the satisfaction of the Controls Contractor.

B. It is not an excuse to have not referenced the manufacturer's installation documentation or to have contacted the controls system manufacturer if wire installation is not understood and done incorrectly by the installing Contractor.

3.05 HARDWARE INSTALLATION

A. Installation practices for devices: All devices are to be mounted level/plumb and per the manufacturer's installation documentation.
   1. It is not an excuse to have not referenced the manufacturer's installation documentation or to have contacted the controls system manufacturer if hardware installation is not understood and done incorrectly by the installing Contractor.

B. Identification
   1. Identify all control wires with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with as-built drawings.
   2. All field enclosures, other than controllers, shall be identified with a nameplate. The lettering shall be in white against a black or blue background.
   3. Junction box covers will be marked to indicate that they are a part of the controls system.
   4. All field devices (except space sensors) that are not mounted within FIP's shall be identified with name plates.
   5. All field devices inside FIP's shall be labeled.

C. Existing controls: Existing controls are not to be reused. All controls system devices will be new.

D. Control system switchover: The Controls Contractor shall minimize control system downtime during switchover. Sufficient installation mechanics shall be on-site so that the entire switchover can be accomplished within a reasonable time frame.

E. Location.
   1. The location of sensors is as indicated in the mechanical and architectural Drawings.
   2. Space temperature, humidity, and CO^2 sensors will be mounted away from machinery generating heat, direct light, and/or diffuser air streams.
   3. If external temperature sensors are installed, sensors will be mounted away from machinery generating heat, direct light, and/or diffuser air streams.
   4. If outdoor air temperature sensors are installed, sensors are to be installed such that the effects of heat radiated from the building or sunlight is minimized.

3.06 SYSTEM CONFIGURATION

A. General
   1. The installing Contractor shall provide all labor necessary to install, initialize, start-up and troubleshoot all system hardware and configurations described in this Section. This includes any requirements necessary to access the web application on third-party devices.
   2. The installing Contractor shall work with Owner's representative to determine configuration parameters including but not limited to, hours of operation, set points, system variables, naming of devices, and site naming. Naming of devices and the site shall

be performed by the installing Contractor. Naming convention of space thermostats shall be space served. Naming convention of zone controllers shall be the equipment serial number. All naming shall be provided by or agreed upon with the Owner.

3.07 SYSTEM COMMISSIONING AND SYSTEM STARTUP

A. Each controls system component shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the controls system shall be tested against the appropriate sequence of operations. Documentation shall be provided to the Owner that proves installation and testing has been completed and points out any mechanical issues found that are not related to the installation of the controls system. Successful completion of the system tests shall constitute the beginning of the warranty period.

B. The Controls Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The Controls Contractor shall have a trained technician available on request during the balancing of the systems. The Controls Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract to assist with functional testing of system as it relates to the controls system.

C. Upon completion of installation, submit copies of record documents. The documents shall be submitted for approval prior to final completion and include:
   1. Testing and commissioning reports and checklists signed off by trained field commissioning personnel.
   2. Name, address, and telephone number of Contractor personnel managing and installing equipment, along with service personnel responsible for supporting the ongoing warranty and services of the control system.
   3. Procedures for operating the controls system including logging on/off, alarm management, reading reports, trends, modification of setpoints, scheduling, and other interactive system requirements.
   4. Information on how to receive support from Pelican Wireless Systems and demonstrate that they are a direct supporting resource. Contact information for Technical Support from Pelican Wireless Systems is to be provided.

END OF SECTION

SECTION 26 0500
BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Work included in this Section: All materials, labor, equipment, services, and incidentals necessary to provide and install the Electrical Work as shown on the drawings and as specified hereinafter, including, but not limited to the following:
   1. Electrical and telecommunications service provisions as outlined on the drawings, including temporary power for construction.
   2. Main switchboard, distribution switchboards, distribution panels, panels, transformers, circuit breakers, and feeders.
   3. Branch circuit wiring, wiring devices and connections to all equipment requiring electrical service.
   4. Lighting fixtures completely lamped, including switches, raceways and wiring.
   5. Emergency egress/exit illumination system.
   6. Telecommunications system.
   7. Fire Alarm system.
   8. Mechanical equipment power connections, and motor starters where noted.
   9. Low voltage lighting control system and programming.
   10. Clock/Speaker system.
   11. All required incidental work, such as roof flashing, electrical testing, title 24 acceptance testing, and temporary power.
   12. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the the drawings.
   13. It is the intent of the drawings and specifications that systems be complete and, except as otherwise noted, be ready for operation.

1.02 RELATED WORK

A. Division 1 - General Requirements

B. Division 9 - Finishes

C. Division 23 - Mechanical

1.03 INCORPORATED DOCUMENTS

A. Requirements of the General Conditions, Supplementary Conditions, and Division 1 Sections apply to all work in this Section, unless modified herein.

B. Published specifications, standard tests or recommended methods of trade, industry or government organizations apply to work of this Section where cited by abbreviations noted below, unless modified herein.
   1. 2022 California Code of Regulations.
   2. 2022 California Building Standards Administrative Code, Part 1, Title 24, C.C.R.
   3. 2022 California Building Code (CBC), Part 2, Title 24, C.C.R. (Based on 2021 International Building Code with 2022 California Amendments).
   4. 2022 California Electrical Code (CEC), Part 3, Title 24, C.C.R. (Based on 2017 National Electrical Code with 2022 California Amendments).
   5. California Energy Code, Part 6, Title 24, C.C.R.
   6. 2022 California Fire Code (CFC), Part 9, Title 24, C.C.R. (Based on 2021 International Fire Code with 2022 California Amendments).

7. 2022 California Green Building Standards (CALGreen) Code, Part 11.
8. American Society of Civil Engineers 7-16 (ASCE/SEI), Minimum Design Loads for Buildings and Other Structures.
9. Underwriters' Laboratories, Inc. (UL).
10. Local Utility Company regulations.

C. All State and Municipal Codes and Ordinances.

1.04 CONDITIONS AT SITE:

A. Visit to site is required of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.

B. Lines of other services that are damaged as a result of this work shall promptly be repaired at no expense to the Owner to the complete satisfaction of the Owner.

1.05 QUALITY ASSURANCE

A. Conformance:
1. All work shall conform to the applicable requirements of Article 1.03 above.
2. The Contractor shall notify the Architect, prior to submission of bid, about any part of the design, which fails to comply with abovementioned requirements.
3. If after contract is awarded, minor changes and additions are required by aforementioned authorities, even though such work is not shown on the drawings or covered in the specifications, they shall be included at Contractor's expense.

B. Coordination:
1. The Contractor shall become familiar with the conditions at the job site, and with the drawings and specifications and plan the installation of the electrical work to conform with the existing conditions and that shown and specified so as to provide the best possible assembly of the combined work of all trades.
2. The Contractor shall work out in advance all "tight" conditions, involving all trades and if found necessary, supplementary drawings shall be prepared by this Contractor, for the Architect's approval, before work proceeds in these areas. No additional costs will be considered for work, which must be relocated due to conflicts with the work of other trades.
3. The Contractor shall coordinate and verify all backbox, device, lighting fixture, or equipment mounting requirements with the devices or equipment to be installed, prior to rough in.

1.06 SUBMITTALS

A. Product Data:
1. Comply with the provisions of Section 01 33 00 - Submittals.
2. Within 15 days after award of the Contract, submit:
   a. Complete electrical, lighting, and signal systems material list of all items proposed to be furnished and installed under this Division. Provide manufacturers data sheets for all devices, raceways, fixtures, equipment, and related products to be used for the Division 26, 27, and 28 work.
   b. Manufacturers' specifications and other data required demonstrating compliance with the specified requirements.
   c. Manufacturers' recommended installation procedures which, when approved by the Architect, shall become the basis for inspecting and accepting or rejecting actual installation procedures used on the work.
3. Shop Drawings: Furnish shop drawings and/or equipment cuts for the following:

a. Light fixtures including lamps and ballasts
b. Main Switchboard, distribution switchboards, distribution panels, panel boards, and transformers. Panel board submittals shall include diagrams of the circuit breaker arrangements in the panels. Arrange circuit breakers in panels exactly as shown on the panel schedules in the construction documents.
c. Scaled drawings of equipment layout in all the electrical and telecom rooms.
d. Fire alarm system
e. Telecommunications system
f. Disconnect switches
g. Motor starters
h. Low voltage lighting control system
i. Mechanical and Plumbing equipment. The Electrical Contractor shall review the Mechanical and Plumbing Submittals, and verify the voltage, wire size and overcurrent protection required. Also provide the Electrical Engineer with a copy of the submittals for their review.
j. Clock/Speaker system if specified herein and/or indicated on the drawings.

4. Test Reports:
   a. Factory Tests: As specified for specific equipment.
   b. Field Tests: Performance tests as specified for specific equipment.
   c. Megger Tests: As specified under TESTING.
   d. When series rated circuit breakers are used, provide a letter from the manufacturer of the equipment confirming that U.L. series rating exists for all protective devices. State the available fault current from the Utility Company and indicate that the overcurrent devices exceed the available fault current at the respective point of protection.
   e. Special Seismic Certification documentation as per CBC Section 1616A and ASCE/SEI 7-16 requirements for all equipment defined as 'critical' with an importance factor of 1.5 in Paragraph 1.10.M.3 of this Section.
   f. Manufacturer's Seismic Certification or Project-Specific Design of Supports and Attachments for all other equipment and fixtures as per CBC Section 1616A and ASCE/SEI 7-16 requirements.
5. Maintenance and Operating Manuals:
   a. Systems Description: Description of operating procedures.
   b. Controls: Diagrams and description of operation of each system.
   c. Equipment: Manufacturer's brochures, ratings, certified shop drawings, maintenance data, and parts lists with part numbers. Mark each sheet with equipment identification number and actual installed condition.
   d. Materials and Accessories: Manufacturer's brochures, parts lists with part numbers, and maintenance data where applicable. Mark each sheet with identification number of system and location of installation.
   e. The Maintenance and Operation Manual shall be presented in a bookmarked PDF file with tabbed sections as stated below. Provide all information in each section as stated below.
      1) 26 2400:
         (a) Insert the approved submittals for the main switchboard and panelboards, and for medium voltage switchgear and transformers if specified herein and/or indicated on the drawings.
         (b) Provide the names, addresses and telephone numbers of the manufacturer and the two closest manufacturer's representatives of the equipment.
      2) 26 2400:
         (a) Insert the approved submittals for the transient voltage surge suppression equipment.
         (b) Insert all operating instructions.
         (c) Provide the names, address and telephone numbers of the manufacturer and the closest manufacturer's representative of the equipment.
         (d) Include the manufacturer's recommended maintenance of the equipment.

3) 26 5101:
   (a) Insert the approved submittals for the light fixtures.
   (b) Highlight the lamp type that was installed for each light fixture.
   (c) Provide the names, address and telephone numbers of the manufacturer and the closest manufacturer's representative for each light fixture.
4) 26 5101:
   (a) Insert the approved submittals for the motion sensing light control equipment.
   (b) Insert all operating instructions.
   (c) Provide the names, address and telephone number of the manufacturer and the closest manufacturer's representative of the equipment.
   (d) Include the manufacturer's recommended maintenance of the equipment.
5) 26 5700:
   (a) Insert the approved submittals for the low voltage lighting control equipment.
   (b) Insert all operating instructions.
   (c) Provide the names, address and telephone number of the manufacturer and the closest manufacturer's representative of the equipment.
   (d) Include the manufacturer's recommended maintenance of the equipment.
6) 27 0000:
   (a) Insert the approved submittals for the telecommunications system.
   (b) Provide the names, address and telephone number of the manufacturer and the closest manufacturer's representative of the equipment.
   (c) Include the manufacturer's recommended maintenance of the equipment.
7) 28 3100:
   (a) Complete the “Record Of Completion” entirely.
   (b) In the “Download File” indicate the exact equipment that the Monitor Modules are monitoring. i.e. fire sprinkler flow switches, tamper switches, etc..
   (c) Simplify the Download File so that it coincides with the submitted and approved fire alarm single line diagram.
   (d) Provide the names, address and telephone number of the manufacturer and the closest manufacturer's representative of the equipment.
   (e) Include the manufacturer's recommended maintenance of the equipment.
   (f) Insert an abbreviated data sheet that states how to test, reset and silence the fire alarm system.
   (g) Insert the name and telephone number of the Central Station that receives the alarms, and the proper sequence to follow during an alarm.
8) 26 0800:
   (a) Insert all systems testing results.

6. Record Documents: "As-builts": As specified under Paragraph 3.2 of this Section.

1.07 DELIVERY, STORAGE AND HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all trades.

B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with approved manufacturers' recommendations.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

D. This Contractor shall personally, or through an authorized representative, check all materials upon receipt at jobsite for conformance with approved shop drawings and/or plans and specifications.

1.08 SCHEDULING/SEQUENCING

A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet the construction schedule, together with any special handling charges, shall be borne by this Contractor.

B. The Contractor shall coordinate production and delivery schedule for all Owner-supplied equipment with the equipment suppliers to ensure that all Owner-supplied equipment is delivered to site in coordination with the construction schedule and in such a manner as to cause no delays in completion of the Contract as scheduled.

1.09 REQUIREMENTS

A. The contract drawings indicate the extent and general arrangements of the conduit wiring systems, etc. If any departures from the contract drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted as soon as practicable, and within thirty-five (35) days after award of the electrical contract.

B. Unless material list and data is received as a complete and all-inclusive submittal within the stipulated time all items shall be provided as specified, with no deviations permitted.

C. Any and all additional costs incurred by the substitution of electrical material or equipment, or installation thereof, whether architectural, structural, plumbing, mechanical or electrical, shall be borne by the Contractor under this Section.

D. Burden of proof of equality of any substitution for a specified product is the responsibility of this Contractor.

E. Where required by Architect to ascertain equality of substitute product, Contractor may be requested to provide the specified item and the submitted substitution for comparison, at no additional cost to the Owner.

1.10 DESCRIPTION OF DEMOLITION AND REPLACEMENT WORK

A. This project includes the demolition and replacement, modification, or enhancement of existing facilities. As such, the project scope for this contractor shall include all associated electrical, lighting, and signal system upgrades and demolition/removal work at the existing buildings(s) and/or site. The intent is that all systems will be complete and functional at the completion of this contract and that all old systems, equipment, feeders, circuits, wiring, and related devices (no longer used) be completely and neatly removed. Where discrepancies between the drawings and existing conditions are noted, the Architect or Owner shall be notified immediately for resolution.

B. As with every renovation project, the electrical work will include (and require) exploration and other field work on a daily basis to complete the new designed equipment and connections within the constraints of the existing building and existing site conditions.

C. The contractor shall include as part of the base bid, sufficient labor hours to provide such exploration and field work throughout the duration of the project. Change orders for miscellaneous coordination of existing conditions will not be approved unless specific and latent conditions are uncovered that warrant such additional compensation or require additional work not shown on the drawings or included in the specifications, or implied by the designed conditions.

D. New raceways and wiring to new and renovated equipment are to be installed unless otherwise noted. Where raceways are installed in accessible concealed locations (i.e. unfinished spaces or electrical / mechanical / attic spaces), EMT with wire shall be used. Where new wiring is required to be routed through existing walls and ceilings that cannot readily be accessible for new conduit, MC cable or flex conduit and wiring may be installed, fished through and secured in each space as required by Code. Non-metallic sheathed cable shall not be utilized on this project.

E. All new raceways shall be installed concealed and all new equipment installed flush, unless otherwise noted on the drawings or in these specifications.

1.11 GUARANTEE

A. This Contractor shall guarantee that all work executed under this Section will be free from defects of materials and workmanship for a period of one (1) year or as per the General Conditions of this project, whichever is longer. Dates shall be from the date of final acceptance of the building. The contractor shall further guarantee that he will, at his own expense, repair and replace all such defective work, and all other work damaged thereby, which becomes defective during the term of the guarantee. Such repair or replacement shall be guaranteed for one (1) year from the date of repair or replacement.

1.12 PERMITS AND INSPECTIONS

A. Do not allow or cause any of the work to be covered or enclosed until it has been tested and/or inspected.

1.13 IDENTIFICATION

A. Switchgear, switchboards, distribution panels, and feeder circuit breakers therein, panels, disconnect switches, motor starters, transformers, motor disconnect switches, cabinets, and other apparatus used for the operation of, or control of circuits, appliances or equipment, shall be properly identified by means of engraved laminated plastic descriptive nameplates mounted on apparatus using stainless steel screws. Nameplates shall have white letters with black background and be submitted to the Architect for approval. Cardholders in any form are not acceptable.

B. Provide p-touch style labeling of circuit designations for all receptacles on the project.

C. Each branch circuit of panel boards to have a permanently fixed number with load directory, mounted under celluloid on inside of cabinet door, showing circuit numbers and typewritten description of equipment supplied by breakers. Where changes are made to existing panelboards, newly typewritten circuit directories shall be prepared to replace existing directories.

D. Provide label on all motors: "Caution. Automatic equipment. May start at any time."

E. Provide silk-screened or engraved identification labels on all switch box covers identifying specific loads that are not readily apparent to the user, including electroshades, projection screens, exhaust fans, audio-visual controls, etc.. Submit proposed labels to Architect for approval prior to manufacture of labels.

F. Provide identification of all pull boxes, junction boxes, and conduit stub-ups on the project as outlined below:
   1. For Power Feeders:
      a. Stencil cover with identifying circuit number.
      b. Lettering 1" high.
      c. Color of lettering black.
      d. Place lettering on cover in neat manner; run parallel to long sides of box.

2. For branch circuits, grounding, communication, signal, and control systems boxes and blank conduit stub-outs:
   a. Paint inside back of each j-box, front of each cover, and ends of each blank conduit stub-out with identifying system color as listed below:

1)	277/480-volt	Orange
2)	120/208-volt	Blue
3)	Telephone/Data	Grey
4)	Ground system	Green
5)	Fire Alarm	Red
6)	Lighting control	Orange/White
7)	Clock/Speaker	Brown
8)	Audio/Visual	Yellow
9)	Security	White
10)	Emergency Power 277V	Orange/Red
11)	Emergency Power 120V	Blue/Red

PART 2 - PRODUCTS

2.01 GENERAL

A. Refer to applicable Division 26, 27, and 28 Sections for complete products specifications.

2.02 MATERIALS

A. Materials of the same type or classification, used for the same purpose, shall be the product of the same manufacturer.

2.03 ACCEPTABLE MANUFACTURERS

A. Materials shall be of make mentioned elsewhere in this specification. All materials shall be the best of their several kinds, perfectly new and approved by the Underwriters' Laboratories.

B. Where material, equipment, apparatus or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality, style and utility and shall be the basis of the bid. Materials so specified shall be furnished under the contract unless changed by written approval of the Architect. Where two or more designations are listed, choice shall be optional with this Contractor, but this Contractor must submit his choice for final approval.

2.04 POSTED OPERATING INSTRUCTIONS

A. Furnish approved operating instructions for systems and equipment where indicated in the technical sections for use by operation and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions as directed. Attach or post operating instructions adjacent to each principal system and equipment including startup, proper adjustment, operating, lubrication, shutdown, safety precautions, procedure in the event of equipment failure, and other items of instruction as recommended by the manufacturer of each system or equipment. Provide weather-resistant materials or weatherproof enclosures for operating instruction exposed to the weather. Operating instruction shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

2.05 CATALOGED PRODUCTS/SERVICE AVAILABILITY

A. Materials and equipment shall be current products by manufacturers regularly engaged in the production of such products. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The 2-year period shall be satisfactorily completed by a product for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6,000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished. The equipment items shall be supported by service organizations which are reasonable convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which the work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Drawings:
   1. The general arrangement and location of wiring and equipment is shown on the electrical drawings and shall be installed in accordance therewith, except for minor changes required by conflict with the work of other trades.
   2. The Contractor shall coordinate and verify all backbox, device, lighting fixture, or equipment mounting requirements with the devices or equipment to be installed, prior to rough in.
   3. Drawings indicate the circuit and panel which supplies each device or fixture. Provide and install conduit and conductors to make all connections from panel to nearest device and from first device to additional devices on same circuit. Conduit size and fill shall satisfy NEC requirements. Two or three different phases supplied by a 3-phase panel may share a single neutral only if circuit positions are adjacent in the panel. Do not exceed 4 #12 or 3 #10 conductors in a ½" conduit, 7 #12 or 5 #10 in a 3/4" conduit, and 11 #12 or 9 #10 in a 1" conduit, unless otherwise noted. Provide common handle-tie on breakers for multi-wire branch circuits (with common neutral), per NEC. If more than three current carrying conductors are installed in one conduit, conductor size shall be increased as required per NEC. Do not share neutrals for branch circuit runs to electronic equipment or where noted on the drawings.
   4. Drawings indicate the location of all light switches. Where fixtures in a room are controlled by more than one switch, the same lower case letter is drawn adjacent to a switch and each fixture controlled by that switch. Where no lower case letter is adjacent to a switch, all fixtures in the room are controlled by that switch. Provide and install conduit and wire from fixture to switch and between fixtures as required to accomplish switching shown. Do not route branch circuit wiring for light fixtures through switch boxes. Where dimming controls are specified, provide required dimming control wiring in addition to power wiring from control device to all controlled light fixtures. Provide separate conduit for dimming control wiring unless otherwise indicated on the drawings.
   5. Drawings indicate location of all signal outlet boxes. Provide and install conduit system as required and complete system wiring, unless otherwise noted.
   6. Control wiring is generally not shown on the plans. Contractor shall refer to control diagrams and provide and install all wiring and raceways required to make all interconnections.

7. All branch circuit wiring No. 12 or No. 10 as noted, all control wiring No. 14, except as noted next to "slash marks" on the drawings, or as noted under "Wire," as specified herein.
8. All dimensions, together with locations of doors, partitions, etc. are to be taken from the Architectural Drawings, verified at site by this Contractor.
9. Maintain "as-built" records at all times, showing the exact location of concealed conduits and feeders installed under this contract, and actual numbering of each circuit. Upon completion of work and before acceptance can be considered, this Contractor must forward to the Architect, updated CAD plans, corrected to show the electrical work as actually installed.
10. All standard 20A branch circuit conductors shall be #12 minimum for up to 75 linear circuit feet, #10 minimum for up to 150 linear circuit feet, and #8 for runs longer than 150 feet.

B. Measurements: Before ordering any material or closing in any work, verify all measurements on the job. Any differences found between dimensions on the drawings and actual measurements shall be brought to the Architect's attention for consideration before proceeding.

3.03 FIELD QUALITY CONTROL

A. All workmanship shall be first class and carried out in a manner satisfactory to and approved by the Architect.

B. This Contractor shall personally, or through an authorized and competent representative, constantly supervise the work and so far as possible keep the same foreman and workmen on the job throughout.

3.04 COORDINATION

A. In electrical rooms, where electrical equipment is located at walls with brace framing, provide and install steel channel supports for mounting of electrical equipment away from wall to avoid conflict with brace framing. Steel channel supports shall be unistrut or equal, and shall include all channels, bases, fittings, etc., as required for a complete installation.

B. In electrical rooms, Contractor is responsible for installation of electrical equipment within the space provided. Contractor shall provide ¼" scale plans of electrical room layouts, and elevations of steel channel supports (where used or required) of electrical equipment for review and approval prior to any installation or rough-in

3.05 INSTALLATION/APPLICATION/ERECTION

A. All electrical raceways and devices shall be installed concealed (for raceways) and/or flush mounted (for devices), unless otherwise noted. Provide cut-in boxes and "fish" flexible MC or flex conduit and wire through existing walls to remain, unless shown otherwise on plans. Cut and patch to facilitate such installation to match adjacent and original finish.

B. All cutting, repairing and structural reinforcing for the installation of this work shall be done by the General Contractor in conformance with the Architect's requirements.

3.06 EMERGENCY POWER SOURCES

A. All emergency source circuits shall be installed in separate raceways (from normal power), per 2017 NEC 700.10(B), or the applicable code at the time of permitting.

3.07 TEMPORARY LIGHTING AND POWER

A. Provide and install temporary lighting and power systems for the duration of construction, of adequate size to accommodate the required lighting and power loads. Coordinate with other trades to insure adequate sizing.

B. Provide distribution equipment as required to support all construction activities.

3.08 FIRE STOPPING AND FIRE RATED PENETRATIONS

A. All electrical equipment mounted in, on, or through fire rated construction shall be installed to maintain the fire rating of the construction.

B. Provide fire rated pads (or other suitable assembly) around all electrical junction boxes in fire rated walls/ceilings/floors to maintain the fire rating.

C. Provide fire rated construction around all recessed light fixtures and/or panel board / cabinets mounted flush in fire rated walls to maintain the fire rating. Coordinate depth of construction with other trades to avoid conflicts.

D. Conduit sleeves shall be provided as a means of routing cables through fire-rated walls or floors. Openings in sleeves and conduits used for system cables and those which remain (empty) spare shall be sealed with an approved fireproof, removable sagging material. Sleeves which pass vertically from floor to floor shall be sealed in a similar manner using an approved re-enterable system. Additional penetrations through rated assemblies necessary for passage of tel/data wiring shall be made using an approved method and permanently sealed after installation of cables.

3.09 ADJUSTING AND CLEANING

A. All electrical equipment, including existing equipment not "finish painted" under other sections, shall be touched up where finished surface is marred or damaged.

B. All equipment, lighting fixtures, etc., shall be left in clean condition, with all shipping and otherwise unnecessary labels removed there from.

3.10 SCHEDULES

A. Coordination: Coordinate installation of electrical items with the schedule for other work to prevent unnecessary delays in the total Work.

3.11 WARNING SIGN MOUNTING

A. Provide the number of signs required to be readable from each accessible side, but space the signs a maximum of 30 feet apart.

3.12 PAINTING OF EQUIPMENT

A. Factory Applied: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test, except equipment specified to meet requirements of ANSI C37.20 shall have a finish as specified in ANSI C37.20.

B. Field Applied: Paint electrical equipment as required to match finish or meet safety criteria. Painting shall be as specified in the respective equipment section.

C. Paint all surface mounted raceways and cabinets, to match surrounding conditions or as directed by the Architect.

3.13 TESTS

A. Testing and inspection: See Section 26 08 00 - Testing.

END OF SECTION

SECTION 26 0800
TESTING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Work Included in This Section: All materials, labor, equipment, services, and incidentals necessary to perform the testing and inspection of the electrical work, including but not limited to the general systems noted below:
   1. Grounding system.
   2. Lighting system.
   3. Distribution system.
   4. Fire Alarm system.
   5. Lighting control system.
   6. Telecommunications system.
   7. Title 24 Acceptance Testing.
   8. Test additional work where specified in other Sections of these specifications or where indicated on the drawings (provide all materials, labor, equipment, services, and incidentals necessary to perform the testing and inspection of this Electrical Work):
      a. Clock/Speaker system.
   9. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.
   10. All work shall comply with Sections 26 05 00 and 26 27 00.
   11. In addition to the general system tests and inspections indicated above, the Contractor shall perform the following inspections and tests. The Contractor shall provide all material, equipment, labor, and technical supervision to perform such tests and inspections:
      a. System Grounding.
      b. Switchgear, Switchboards, Distribution Panels, Panelboards.
      c. Feeders.
   12. The purpose of these tests is to assure that all tested electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design specifications.

1.02 APPLICABLE CODES, STANDARDS, AND REFERENCES

A. All inspections and tests shall be in accordance with the International Electrical Testing Association - Acceptance Testing Specifications ATS-2021 (referred to herein as NETA ATS-2021).

1.03 QUALIFICATIONS

A. Qualifications of the Testing Firm shall be as listed in NETA ATS-2021.

PART 2 - PRODUCTS

2.01 THIS ARTICLE DOES NOT APPLY TO TESTING.

PART 3 - EXECUTION

3.01 GENERAL

A. Final test and inspection to be conducted in presence of the Authority having Jurisdiction (AHJ) or Inspector of Record (IOR). Test shall be conducted at the expense of, and managed by, the Contractor, at a mutually agreed time. Submit written test report of all tests, with test result values and overall outcome.

B. All portions of the electrical installation shall be inspected and tested to ensure safety to building occupants, operating personnel, conformity to code authorities and Contract Documents, and for proper system operation.

3.02 INSPECTIONS AND TESTS

A. Tests: Field tests shall be performed and reports submitted, as per Section 26 05 00, Part 1.
   1. Final Inspection Certificates: Prior to final payment approval, deliver to the Owner, with a copy to the Architect, signed certificates of final inspection by the appropriate local authority having jurisdiction.
   2. Grounding System:
      a. All ground connections shall be checked and the entire system shall be checked for continuity. The resistance of grounding electrodes in the system shall be measured using a 3 point fall-of-potential method. The maximum ground resistance shall be three ohms. If the measured ground resistance exceeds three ohms, install (1) additional ground rod, bonded and interconnected with the grounding electrode system.
      b. Ground tests shall meet or exceed the requirements of the National Electric Code.
   3. Lighting Systems:
      a. The interior and exterior lighting systems shall be checked for proper local controls and operation of entire installation, including the operation of the low voltage lighting control system.
   4. Power Distribution System:
      a. Test main switchboard, distribution boards, panel boards, and transformers for grounds and shorts with mains disconnected from feeders, branch circuits connected and circuit breakers closed, all fixtures in place and permanently connected and grounding jumper to neutral lifted and with all wall switches closed.
      b. Test each individual circuit at each panelboard with equipment connected for proper operation. Inspect the interior of each panel.
      c. Check verification of color coding, tagging, numbering, and splice make-up.
      d. Verify that all conductors associated with each circuit are in same conduit.
      e. Demonstrate that all lights, jacks, switches, outlets, and equipment operate satisfactorily and as called for.
      f. Perform megger tests of all new distribution system feeders prior to energizing. All Cables failing megger tests or with evidence of damage shall be removed and replaced in their entirety (no splices), at no cost to the Owner. Damaged cables may not be field repaired without specific approval of the Architect.
   5. Fire Alarm System: Verify that all equipment, components, and devices function as specified. Refer to Section 28 3101 for additional testing requirements.
   6. Lighting Control System: Verify that all equipment, components, and devices function as specified. Refer to Section 26 5101 for additional testing requirements.

7. Telecommunications System: Verify that all equipment, components, and devices function as specified. Refer to Section 27 0000 for additional testing requirements.
8. Where the following systems are specified herein and/or indicated on the drawings, verify that all equipment, components, and devices function as specified and meet all additional testing as described in related individual Sections of this specification:
   a. Clock/Speaker system.

B. Title 24 Acceptance Testing: Contractor shall complete the requirements for Title 24 Acceptance Testing, as per CA Title 24, Part 6.
1. Perform testing requirements as per Title 24 Lighting Acceptance requirements. Testing shall include construction inspection of installed controls, occupancy / motion sensor testing, manual daylighting controls testing, automatic time switch controls testing, and demand response system interface, as applicable.
2. Complete and submit all required forms for complete Acceptance Testing.
3. Acceptance tests must be performed or overseen by certified Acceptance Test Technicians.
4. Obtain required review and approval of Acceptance Forms to allow final certificate of occupancy to be granted.

END OF SECTION

SECTION 26 2400
SERVICE AND DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Work Included in This Section: All materials, labor, equipment, services and incidentals necessary to install the electrical work as shown on the drawings and as specified hereinafter, including but not limited to the work listed below.

B. Underground service distribution conduits and cables where noted for power and telecommunications services, including utility company coordination.

C. Temporary power for construction.

D. Concrete pad and ground rods for Utility installed padmounted transformer.

E. Distribution Panels, Transformers, Distribution System, Panel Boards, Grounding, and Overcurrent Protective Devices.

F. All required incidental work, such as excavating, backfilling, testing, and temporary power.

G. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.

H. All work shall comply with Sections 26 05 00 and 26 27 00.

1.02 RELATED WORK

A. Division 09 - Finishes

B. Division 23 - Heating, Ventilating, and Air Conditioning

1.03 SUBMITTALS

A. Comply with the provisions of Section 26 05 00 - Submittals.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Refer to Section 26 05 00, Part 2 - Products

B. All new equipment shall match existing.

C. List of Equipment Manufacturers:

D. Switchboards and Motor Control Centers
   1. Eaton-Cutler Hammer, General Electric, Industrial Electric Manufacturing, Schneider-Square D.

E. Panelboards and Distribution Panel
   1. Same manufacturer as Main Switchboard.

F. Dry-type Transformers
   1. Eaton-Cutler Hammer, Schneider-Square D, General Electric.

2.02 MATERIALS

A. Provide and install conduits for primary cables by utility company, concrete pad and grounding for utility company transformer, and conduit for secondary service to main switchboard. Comply with all Utility Co. requirements.

B. Furnish and install telecommunications service conduits and pullboxes; install conduits to main point-of-entry backboard as indicated on the drawings. All work shall conform to utility company requirements and to Section 26 27 00.

C. Grounding:
   1. Provide and install grounding system as noted on the drawings.
   2. Grounding electrode conductor: bare stranded copper type, #4/0 minimum.
   3. Install ground wires in rigid conduit.
   4. All grounding electrode conductor connections "thermite" or "cad-weld" welded.
   5. Use approved pressure type solderless connector or use fusion welding for all connections to and bonding of grounding electrode system. All connections shall be visible, readily accessible for testing purposes. Grounding electrode conductor between the grounding electrode and service equipment: Minimum #4/0.
   6. Furnish and install solid copper or copper-clad 5/8" x 10'-0" ground rod(s). Where multiple ground rods are shown, install a minimum of 20'-0" apart. Install ground rods in accessible boxes with covers. Furnish and install 2-#4/0 bare copper cables between multiple ground rods and main switchboard ground bus.
   7. Terminate grounding conduits at equipment with ground bushing, with ground wire connected through bushing.
   8. Provide No. 12 stranded (green) THHN conductor from outlet box to ground screw of every receptacle.
   9. Ground all isolated sections of metallic raceways.
   10. Provide #12 minimum stranded (green) THHN conductor sized per NEC, or as noted, connected continuously throughout branch circuit for all circuits, bonded to panel ground bus, and to all electrical devices and equipment enclosures.
   11. Grounding electrode installed as follows:
      a. Place #4/0 bare copper cable in foundation trench; tensioned, supported in such a manner that it cannot be less than two (2) inches from bottom or side of concrete when foundation concrete is poured; not less than one hundred feet of conductor. Embed in foundation with a loop at approximate center, brought out at top of foundation at location of building service equipment for connection to service equipment and for bonding to other parts of the grounding electrode system.
      b. Use approved pressure type solderless connector or use fusion welding for all connections to grounding electrode. Connection visible, readily accessible for testing purposes. Grounding electrode conductor between the grounding electrode and service equipment: Minimum #4/0.
      c. Connect grounding electrode system to metallic water service entry metallic cold water pipe (if available) with nonferrous clamp and bare copper cable (sized as required) in conduit. Connection shall be accessible for inspection.
      d. Connect grounding electrode system to effectively grounded building steel as indicated on the drawings. Use exothermic weld, connection shall be accessible for inspection.
      e. After installation, test system using the three-point fall of potential method only. Record results and submit to Architect for approval. If resistance to ground exceeds three ohms, install an additional ground rod, bonded and interconnected to the grounding electrode system.

f. Connect ground bar of separately derived systems (e.g all dry-type transformers) to effectively grounded building steel at the closest possible accessible location, or if building is concrete, or the steel is not effectively grounded, to the main switchboard ground bus: Use #4/0 copper conductor for all connections.

D. Panelboards:
1. Surface (or flush where indicated on the drawings) mounted, with branch circuits as indicated on the drawings.
2. Enclosures: code gauge galvanized sheet steel with welded full flange end pieces, stretcher- leveled steel trim, backpan and door.
3. Bussing of copper with silver-plated contact surfaces.
4. Provide a 200% rated neutral bus for panels supplied with 200% rated feeders (incoming or outgoing). Refer to single line riser diagram for feeder ratings.
5. Properly identify the “high leg” of 4-wire delta connected systems as required by NEC 384-3(e).
6. Trims on surface-mounted cabinets secured with nickel-plated screws with cup washers, bottom of all trims to have lugs for resting on cabinet flange.
7. Panels shall be 20 inches minimum in width, provided with approved gutter space, barriers and adjustable supports. Doors mounted with concealed hinges provided with combination spring latch and lock. Doors and trims and surface mounted cabinets primed and finished with one coat baked on gray enamel. All visible panel enclosures and covers in finished (occupied) areas shall be painted to match adjacent wall finish.
8. Breakers on same phase to be aligned horizontally. Each panel provided with quantity (5) spare handle locks. Install handle locks on all breakers serving fire alarm equipment.
9. Each branch circuit of panelboards to have a permanently fixed number with one word directory, mounted under celluloid on inside of cabinet door, showing circuit numbers and typewritten description of outlets controlled by breakers. Color code mains and each breaker terminal, same as conductor insulation.
10. Each panel shall be equipped with a copper ground bus.
11. All panels shall be fully bussed to accept future circuit breakers, with breaker hardware provided where indicated on the drawings.
12. Panel board submittals shall include diagrams of the circuit breaker arrangements in the panels. Arrange circuit breakers in panels exactly as shown on the panel schedules in the construction documents - no deviations permitted.

E. Circuit Breakers:
1. General: Circuit breakers shall be molded case rated for 480 or 240 volts, multiple or single pole and amperage rating as shown on the drawings, bolt on, manually operated with "de-ion" arc chutes.
2. For all circuit breakers rated 1,200 Amps or higher, provide an arc energy reduction measure in compliance with NEC 240.87(B), to reduce arc clearing time.
3. Main circuit breaker shall be shall be rated to interrupt the available short circuit current - 65,000 amps RMS unless otherwise indicated on the drawings.
4. Distribution circuit breakers shall be rated for the amps interrupting capacity noted on the drawings or U.L. series rated with the main circuit breaker.
5. Branch circuit breakers shall be rated for the amps interrupting capacity or U.L. series rated with the distribution and main circuit breakers, General Electric type THQB or equal, minimum 10,000 A.I.C for 120/208 volt; type TEY or equal, minimum 14,000 A.I.C for 277/480 volt.
6. Where mechanical equipment is U.L. listed for overcurrent protection with fuses or HACR type circuit breakers, provide fuses where a fused switch is shown. Where the overcurrent protection is a circuit breaker provide HACR, (Heating, Air-Conditioning and Refrigeration) type.
7. Provide switch rated type "SWD" circuit breakers were the circuit breaker is used as a switching device in a panelboard.

F. Dry-Type Transformers:
1. Ventilated type.

2. Dry-type general distribution transformers shall meet the California Title 24 requirements for energy efficiency standards and DOE 10 - CFR, Part 431 (2016) for energy efficient transformers.
3. Transformer shall be 3 phase, 60 Hertz. Primary winding shall be Delta connected and secondary winding shall be Wye connected. The temperature rise at rated voltage and full load shall not exceed 150 degrees C with a 220 degrees C U.L. Component Recognized Insulation System. The windings shall be aluminum or copper.
4. The higher voltage winding shall have quantity (6) 2.5% taps - (2) FCAN and (4) FCBN. Set secondary voltage for 120/208V.
5. Transformer terminals shall be front connected for ease of installation and maintenance.
6. Where the transformers are installed outdoors provide weatherproof drip cover, rodent screen and a weathertight rating of the enclosure.

G. Magnetic starters: shall be rated in accordance with latest published NEMA standards for size and horsepower rating, Eaton-Cutler Hammer A-200 series or equal. Provide with overload sensor in each phase, hand-off-auto switch, red "run" pilotlight, in NEMA 1, NEMA 4X, or NEMA 3R enclosure or in motor control center where indicated. Coil shall be rated 120 VAC. Starters shall be across-the-line nonreversing unless otherwise noted.
   1. Contacts: Across-the-line magnetic starters shall be equipped with double break silver alloy contacts. All contacts shall be replaceable without removing power wiring or removing starter from panel. The starter must have straight-through wiring.
   2. Coils: Coils shall be of molded construction. All coils shall be replaceable from the front without removing the starter from the panel.
   3. Overload Relays and Thermal Units: Overload relays shall be the melting alloy type with a replaceable control circuit module. Thermal units shall be of one-piece construction and interchangeable. The starter shall be inoperative if the thermal unit is removed.

PART 3 - EXECUTION

3.01 REFER TO SECTION 26 05 00 FOR DETAILS OF WORK UNDER THIS SECTION.

3.02 INSTALLATION/APPLICATION/ERECTION

A. Excavate and trench as necessary for the electrical installation, and when the work has been installed, inspected and approved, backfill all excavations with clean earth from excavation, or imported sandy soil in maximum 8" (eight-inch) layers, moisten and machine tamp to 95% compaction, and restore the ground and/or paving or floor surfaces to their original condition.

B. Switchboards and Distribution Panels Installation: Mount as detailed on the drawings.

C. Motor Connections:
   1. Install motor circuits complete for all motors by other trades
   2. Furnish and install all disconnect switches, outlet boxes, etc., as required by code.
   3. All motor and temperature control low voltage wiring shall be installed and connected by Division 23 Section of specifications, unless otherwise indicated on electrical drawings.

D. Motor Starters Installation:
   1. Deliver starters to site without thermal overload elements. Determine nameplate rating of each motor, after motor and starter installation, select thermal element rating from measured motor running current and install proper elements in starters.
      a. Submit chart denoting motor designation, motor H.P., motor running current (N.P.), actual running current fuse/breaker size and thermal element catalog number. Take readings of motor running currents in conjunction with Division 23 - Heating, Ventilating, and Air Conditioning.

3.03 TESTS

A. Testing and Inspection: See Section 26 08 00 - Testing.

END OF SECTION

SECTION 26 2700
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Work included in this Section: All materials, labor, equipment, services, and incidentals necessary to install the electrical work as shown on the drawings and as specified hereinafter, including but not limited to the work listed below:
   1. Raceways, feeders, branch circuit wiring, wiring devices, safety switches and connections to all equipment requiring electric service.

B. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.

C. All work shall comply with Section 26 05 00.

1.02 RELATED WORK

A. Division 09 - Finishes

B. Division 23 - Motors and Mechanical Equipment Installation

1.03 SUBMITTALS

A. Comply with the provisions of Section 26 05 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Refer to Section 26 05 00, Basic Electrical Requirements, Part 2 - Products.

B. List of Equipment Manufacturers:

C. Conduit and Conduit Fittings
   1. Allied Tube and Conduit, Wester Tube and Conduit, LTV Steel Tubular, National Electric Products, AFC, Republic Steel Corporation, Rome Cable Corporation, United States Steel Corporation, Killark Electric Manufacting Company, Raco, VAW Aluminum Company, Bridgeport, Steel City, Thomas & Betts, Carlon, O.Z. Gedney, Appleton, Regal.

D. Wire and Cable (600V)
   1. American Wire Company, General Wire and Cable Corporation, Okonite Company, Rome Cable Corporation, Cerrowire, American Insulated Wire, AFC Cable Systems, Essex, Simplex Wire and Cable Company, Southwire.

E. Pull Boxes, Gutters, Special Cabinets
   1. Schneider-Square D Company, Columbia Electric Manufacturing Company, General Electric Company, Eaton Inc.

F. Outlet Boxes

1. Appleton Electric Company, Killark Electric Manufacturing Company, Lew Electric Fittings Company, National Electric Products Corporation, Raco, Steel City Electric Company, Carlon, Bowers.

G. Wiring Devices
   1. Leviton, Arrow-Hart, Cooper, Hubbell, Lutron, Bryant.

H. Conduit Racks, Hangers
   1. General Electric Company, Killark Electric Manufacturing Company, Caddy, National Electric Products Corporation, Republic Steel Corporation, Rome Cable Corporation, United States Steel Corporation, VAW Aluminum Company, Superstrut, B-Line.

I. Safety Switches (Disconnect and Fusible)
   1. Schneider-Square D Company, Eaton-Cutler Hammer Inc, General Electric Company.

J. Fuses
   1. Bussman Manufacturing Company, Chase-Shawmut Company.

K. Firestopping
   1. 3M, Nelson.

2.02 MATERIALS

A. Raceways: Only the raceways specified below shall be utilized on this project. Substitutions shall be pre-approved in writing. All bare conduit ends (stub-ups or stub-outs) shall be provided with bushed ends or manufactured insulated throat connectors:
   1. Rigid Type - hot dip galvanized or sherardized steel, use on all exterior locations, below grade or in concrete slab, and to 18" on either side of structural expansion joints in floor slabs, with completely watertight, threaded fittings throughout. Compression fittings are not acceptable.
      a. All rigid steel conduit couplings and elbows in soil or concrete or under membrane to be ½ lap wrapped with Scotch #50 tape and threaded ends coated with T&B #S.C.40 rust inhibitor prior to installation of couplings.
      b. ½ lap wrap all rigid steel conduit stub-ups from slab or grade to 6" above finished grade level with Scotch #50 tape.
   2. In lieu of rigid steel conduit for power and control raceways and branch circuit conduits in soil or concrete slabs, "Schedule 40" PVC with Schedule 80 PVC conduit elbows and stub-ups may be used with code size (minimum No. 12) ground wire. A “stub-up” is considered to terminate 6" above the finished surface.
      a. Schedule 80 PVC conduit shall be used in all concrete footings or foundations and to 18" of either side of footings or foundation walls.
      b. Schedule 80 PVC conduit shall be used in all concrete masonry unit (CMU) walls or columns.
      c. All conduit runs in concrete floor slabs (where allowed) shall be installed to comply with all applicable CBC and structural codes to maintain the structural integrity of the floor slab. Where conflicts occur, alternate routing shall be provided at no additional cost to the Owner.
      d. Where schedule 80 PVC is coupled to schedule 40 or other raceways with differing interior dimensions, each end shall be reamed with a reaming tool to reduce the edge profile for protection of the passing conductors during the pull.
   3. Intermediate metal conduit may be used in all exposed interior locations, except that electrical metallic tubing may be used in some locations as noted below. Utilize steel compression type fittings for all exposed conduit runs, unless otherwise noted. Die-cast zinc fittings are unacceptable.
   4. Electrical metallic tubing shall be used exposed in interior electrical and mechanical rooms, in interior unfinished spaces, and in interior concealed and furred spaces, made up with steel watertight or steel set screw type fittings and couplings. EMT shall not be used in under-building

crawl spaces or other areas subject to moisture. Set screws shall have hardened points. Die-cast zinc fittings are unacceptable.

5. Surface mounted rectangular steel raceways and boxes: use for all surface mounted installations, unless otherwise noted (all catalog numbers listed are Wiremold - equals allowed) - color Ivory, unless otherwise noted;
   a. #V500 for branch power runs on ceilings and walls (used with V500 series straps, elbows, connectors and V5000 series low profile boxes and covers).
   b. #2000 or 2400 low profile for larger power run requirements on ceiling or walls (used with V2000 series straps, elbows, connectors and low profile boxes and covers).
   c. #2400D for dual service power and tel/data run requirements (used with divided V2400 boxes and covers).
6. Surface mounted rectangular non-metallic dual service raceways; Wiremold #5400 (Ivory) or equal with all required compatible activation covers, bezels, inserts, and blank plates for a complete installation. Refer to drawings for outlet quantities in raceway and feed points. All raceway fed flush from rear with horizontal j-boxes, unless otherwise noted.
7. Use flexible conduit for all motor, transformer and recessed fixture connections, minimum ½"; "Seal tite" type used outdoors and in all wet locations, provide with code size (minimum No. 12) bare ground wire in all flexible conduit.
8. All conduit cuts (factory or field cut) shall be perfectly square to the length of the conduit and cut ends shall be reamed with a reaming tool to provide a smooth edge to the passing conductors and to remove all burs and scrapes. Use of a hand file is not acceptable.
9. All electrical raceways shall be installed concealed, unless otherwise noted. Cut and patch to facilitate such installation to match adjacent and original finish. All exposed conduits, where required, shall be installed parallel to building members.
10. All emergency source circuits shall be installed in separate raceways (from normal power), per 2017 NEC 700.10(B), or the applicable code at the time of permitting.
11. Where existing conditions preclude the installation of EMT in existing walls to remain, provide and install cut-in type boxes and "fish" flexible MC or flex conduit and wire through existing walls to remain, unless shown otherwise on plans.
12. Fasten conduits securely to boxes with locknuts and bushings to provide good electrical continuity.
13. Provide chrome escutcheon plates at all exposed wall, ceiling and floor conduit penetrations.
14. Support individual suspended conduits with heavy malleable strap or rod hangers; supports for ½ inch or 3/4 inch conduit placed on maximum 7-foot centers; maximum 10-foot centers on conduits 1 inch or larger.
15. Support multiple conduit runs from Kindorf B907 channels with C-105 and C-106 straps.
16. Conduit bends - long radius.
17. Flash conduits through roof, using approved roof jack; coordinate with General Contractor.
18. To facilitate pulling of feeder conductors, install junction boxes as shown or required.
19. All empty conduits on the project shall be provided with a nylon pull rope to allow pulling of future conductors intended for the specific raceway. Provide plastic wire-tie style nameplate tags on each end of pull rope with printed identification of conduit use and the location of the opposite end of the rope. Pull ropes for telecommunications service conduits shall meet the utility company requirements.
20. Where conduits pass through structural expansion joints in floor slab, rigid galvanized conduit shall be used 18" on either side of joint, complete with Appleton expansion couplings and bonding jumpers, or equal. All above grade expansion joint crossings shall also utilize expansion joint couplings or flex conduit transitions as required for each particular installation. Installed condition shall allow for a minimum deflection of raceway and wire (in any direction) equal to the structural expansion joint dimension (building to building). No solid conduits shall be allowed to cross expansion joints without proper provisions for building and seismic movement.
21. Minimum cover of conduits in ground outside of building - 36 inches, unless otherwise noted.
22. Provide and install exterior wall conduit seals and cable seals in the locations listed below. Coordinate installation and scheduling with other trades:

a. Conduit seals through exterior wall or slab (below grade): O.Z. Gedney series “FSK" in new cast in concrete locations, series "CSM" in cored locations.
b. Conduit seals through exterior wall or slab (above grade): O.Z. Gedney series "CSMI."
c. Cable seals at first interior conduit termination after entry through exterior wall or slab: O.Z. Gedney series "CSBI." Coordinate quantity of conductors at each location.

B. Outlet Boxes and Junction Boxes. Verify all backbox requirements with devices to be installed prior to rough-in.
1. One piece steel knockout type drawn boxes, unless otherwise noted, sized as required for conditions at each outlet or as noted.
2. Flush-mounted boxes equipped with galvanized steel raised covers for device mounting flush with finished surface. Provide extension rings as required on all acoustical or additional wall treatment areas to bring top of cover flush with finished surface (coordinate with architectural drawings). Devices shall be capable of being tightly mounted to boxes without distorting or bending device or mounting hardware.
3. Boxes for fixture outlets: 4-inch octagon or larger as required, or as noted.
4. Switch and receptacle outlets - not smaller than 4-inch-square in furred walls, with raised cover for single device; ganged where required.
5. Outlet and switch boxes for wet locations, cast aluminum FS or FD type with cast aluminum gasketed spring lid cover. Weatherproof “Bell” type boxes are not acceptable.
6. All connectors from conduit to junction or outlet boxes shall have insulated throats. Connectors shall be manufactured with insulated throats as integral part. Insertable insulated throats are unacceptable.
7. Outlet boxes for telecommunications, 4" square or larger as required or noted, multi-ganged for voice, data, and other services where indicated on the drawings.
8. Conduit Bodies: Malleable iron type, with lubricated spring steel clips over edge of conduit body, O-Z/Gedney type EW, or equal.
9. Pull boxes: All site pull boxes shall be flush in-ground concrete, with engraved covers identifying service use (i.e. electrical, communications, etc.). Boxes shall be Nema 250, Type 6, outside flanged, with recessed cover for flush mounting, by Christy or equal, with required depth to provide box and conduit depths shown or required.
a. Provide concrete covers for all boxes in planted or paved areas (up to available concrete cover size).
b. Provide galvanized steel covers for all larger boxes (when concrete is not available), or in traffic areas. No cast iron covers.
c. Provide bolted covers and slab bottoms (with grouted perimeter) or vault type boxes for all electrical distribution and signal system pull boxes used for site distribution, to prevent rodent entry. No collar type boxes with dirt or gravel bottoms
d. Provide drain hole at bottom of all vault type boxes, with loose aggregate base below, for proper drainage.
e. All covers to be completely flush with finished adjacent surfaces.
f. Provide galvanized steel H20 rated covers and installation of box rated for H20 in all traffic areas.
g. Provide pullboxes per utility company specifications for all electrical primary and secondary services and for telecommunications service runs. Verify exact size and type prior to order with each utility company.

C. Wire and Cable (line voltage and signal systems):
1. 600-volt class where used for or run with line voltage power wiring, insulation color coded, minimum No. 12 AWG for power branch circuits, No. 14 for power control circuits, and wiring size and type as directed by signal system manufacturer for each signal system.
2. All conductors shall be copper.
3. Size and insulation type:

a. Standard locations: #12 to #1 AWG: THWN for wet locations and THHN for dry locations. #1/0 through #4/0 AWG: XHHW (55 Mils). 250MCM and larger: XHHW (65 Mils). All wire sizes used shall be based on a 75 degree insulation rating, unless specifically used with 90 degree rated breakers and devices.
b. All wiring (power and signal) installed underground between buildings, or in wet or damp locations, shall be outside listed and rated for wet locations.
c. High temperature and non-standard locations: Provide wire type and insulation category suitable for area of use as defined in NEC table 310-13.

4. Conductors No. 8 and larger and as otherwise noted on drawings shall be stranded. Power conductors No. 12 and No. 10 shall be solid or stranded. Power conductors No. 14 or smaller shall be solid.
5. Provide signal system wiring for each system to meet the system manufacturers requirements and recommendations for each device or equipment type. Signal wiring systems shall be provided with shielding and/or insulation type and cable quantities as directed by the manufacturer, and meet all NEC requirements for locations used.
6. Install all wiring branch circuits and feeders (low voltage and line voltage) in conduit unless noted otherwise on the drawings. Contractor shall mandrel all feeders and pass a "sock" (or utilize other suitable means) through each raceway prior to pull to remove all water and construction debris. All raceways shall be completely clear of any obstructions or debris and all cut ends shall be reamed, prior to pull. Utilize pulling compound on all runs to insure minimum friction and pulling tension.
7. Megger test all feeders prior to energizing. See section 26 08 00 for additional information.
8. Approximately balance branch circuits about the neutral conductors in panels.
9. Connections to devices from "thru-feed" branch circuit conductors to be made with pigtails, with no interruption of the branch circuit conductors.
10. Neutral conductor identified by white outer braid, with different tracers of "EZ" numbering tags used where more than one neutral conductor is contained in a single raceway.
11. Neatly arrange and "marlin" wires in panels and distribution panelboards with "T and B Ty-rap" or approved equal plastic type strapping.
12. All wire and cable shall bear the Underwriters' Label, brought to the job in unbroken packages; wire color-coded as follows:

	Voltage	Phasing	A	B	C	N
b.	120/208	3PH4W	Black	Red	Blue	White
c.	2083PH	3W	Black	Red	Blue	--
d.	277/480	3PH4W	Brown	Orange	Yellow	White
e.	4803PH	3W	Brown	Orange	Yellow	--
f.	120/240	3PH4W	Black	Red	Blue	White
g.	2403PH	3W	Black	Red	Blue	--

13. The equipment grounding conductor shall be insulated copper; where it is insulated, the insulation shall be colored green.
14. Label each wire of each electrical system in each pull box, junction box, outlet box, terminal cabinet, and panelboard in which it appears with "EZ" numbering tags indicating the connected circuit numbers.
15. Properly identify the “high leg” of 4-wire delta connected systems (in each accessible location) as required by NEC 110.15 and 230-56.
16. Provide permanently affixed adhesive labels with machine printed lettering (min. 1/8" high) at junction boxes serving fixtures that are supplied by (2) electrical sources (i.e. normal and emergency lighting). Label to read "CAUTION - This light fixture is powered by (2) separate sources. The normal power source breaker and the emergency power source breaker must be turned off before servicing this light fixture."
17. Install feeder cables in one continuous section unless splices are approved by Architect. Exercise care in pulling to avoid damage or disarrangement of conductors, using approved grips. No cable shall be bent to smaller radius than the spool on which it was delivered from the manufacturer. Color code feeder cables at terminals. Provide identifying linen tags in each pullbox.

D. Switches: Model numbers are Hubbell, color to be selected by architect, unless otherwise noted. All switches to utilize screw terminals for wire connections - no plug-in terminations:
   1. Single Pole - No. HBL1221
   2. Two Pole - No. HBL1222
   3. Three Way - No. HBL1223
   4. Momentary contact - No. HBL1557
   5. Momentary contact Keyed - No. HBL1556L
   6. Keyed, - No. HBL1221L
   7. Pilot Light (on with load on) - Hubbell No. 1221-PLC
   8. Motor Rated Double Pole (30A) - Hubbell No. 7832
   9. Motor Rated Three Pole (30A) - Hubbell No. 7810.
   10. Low voltage Data line switches - Refer to lighting control system (for compatibility)

E. Receptacles: Mounting straps and contacts shall be one piece design, constructed of minimum .050" solid brass. Base shall be high strength, heat resistant, glass reinforced nylon. Device shall accept up to #10 wire, side or back wired with screw terminals - no plug-in terminations. Hubbell, Leviton, Pass & Seymore, or equal. Color to be selected by architect, unless otherwise noted. Numbers listed below are Hubbell:
   1. 15A 3PG 125 volt duplex - No. HBL5262
   2. 20A 3PG 125 volt duplex - No. HBL5362
   3. 20A 3PG 125 volt ground fault interrupter receptacle; GFI receptacles shall conform to the 2006 UL requirements to a) interrupt power to the unit in the event of internal failure, or b) provide an audible or visual indication of internal failure of the GFI; No. GF20 or equal. Through wiring to down stream GFI designated receptacles is not acceptable.
   4. 15A 3PG 125 volt half controlled duplex receptacle - No. BR15C1(color), with permanent "controlled" marking, factory applied.
   5. 20A 3PG 125 volt half controlled duplex receptacle - No. BR20C1(color), with permanent "controlled" marking, factory applied.
   6. 15A 3PG 125 volt full controlled duplex receptacle - No. BR15C2(color), with permanent "controlled" marking, factory applied.
   7. 20A 3PG 125 volt full controlled duplex receptacle - No. BR20C2(color), with permanent "controlled" marking, factory applied.
   8. GFI Module (blank face), no indicator light, 20A - No. GFBF20 or equal.
   9. All receptacles located in exterior or wet locations shall be corrosion resistant with UV stabilized body.
   10. All receptacles in locations identified in NEC 406.12 (i.e. dwelling units, hotel/motel guest rooms, child care, preschool, K-12 schools, business office common areas, clinics, medical, and outpatient facilities, assembly area common areas, dormitory units, and assisted living units) shall be tamper resistant.

F. Plates: Leviton, or equal, except as noted:
   1. The color of all faceplates shall match the color of the devices installed under/in the faceplate, except as specifically noted otherwise.
   2. For flush outlet boxes, for switches, and receptacles: nylon, color to be selected by architect, unless otherwise noted.
   3. Plates for surface-mounted outlets: galvanized steel unless otherwise noted.
   4. Weatherproof duplex receptacle plates for exterior locations with ground fault interrupter receptacles in type FS or FD boxes - Hubbell #WPFS26 or compatible equal. Verify cover compatibility with box type and device installed.
   5. Weatherproof "in-use" cover, vertical or horizontal mount, for exterior with GFCI receptacles. Die-cast metal alloy, TayMac MX series or equal with openings to match installed devices.
   6. Locking plates for duplex receptacles where noted; Pass & Seymour #WP26-L (non- weather proof).

7. Locking plates for duplex exterior GFCI receptacles (or in wet or damp locations); Heavy duty cast aluminum flush cover with locking latch and key, Pass & Seymour #4600 with appropriate mounting plate for type of device installed. Coordinate backbox requirements and finished wall trim-out with wall installer prior to rough-in to insure an adequate and neat trim appearance upon completion.
8. Plates for flush tele/data boxes: white nylon or as otherwise directed - provide and install at each tele/data outlet plate to match duplex power outlet plate, for jack installation under Section 27 00 00. Where the power and tele/data outlet boxes are shared the plate shall be continuous in multi-gang locations. See drawings.

G. Equipment Disconnects: All disconnects shall be located to allow proper code required clearance in each area. Locations shown on drawings are diagrammatic only. The contractor shall coordinate exact locations in the field (with other trades) prior to rough-in to insure proper clearances.
1. Motor Disconnect Switches and Safety Switches: General Electric Company Heavy Duty Type "THD", cover interlocked with operating handle so that cover cannot be opened with switch in closed position and switch cannot be closed with cover in open position. 240V or 480V rating, single or multi-pole as required or as noted on drawings, in Nema 1 enclosure indoors or Nema 3R enclosure outdoors unless otherwise noted. Provide dual element motor circuit fuses sized as recommended by equipment manufacturer (for final equipment actually installed).
2. Code required disconnects: Provide a local disconnect in addition to the branch circuit protection device for all equipment as required by code (whether shown or not). Disconnects shall consist of a motor rated switch (or disconnect) for all motor loads less than 3/4HP or other suitable disconnect sized to match branch circuit conductors and load current of equipment, with number of poles as required.

H. Lugs and Connectors: Thomas and Betts "lock-tite", for No. 4 and larger wire; 3M "Scotchlock" fixed spring screw-on type wire connectors with insulator for No. 6 and smaller wire.
1. All splices shall be made up with screw-on type connectors - no plug-in or push-in style connectors acceptable. Wires shall be solidly twisted together with electricians pliers before screw-on connector is installed to ensure a proper connection in the event of wire nut failure. No exceptions.
2. Connectors listed or labeled for “no wire twisting required” are not an acceptable substitute for actual wire twisting.
3. Utilize porcelain type connectors in all high temperature environments (above 105 degrees Celsius).

I. Splice Insulation: "Scotch" electrical tape with vinyl plastic backing or rubber tape with protective friction tape for interior work.
1. Splices in electrical cables of 600 volt insulation class in underground system duct shall be made only in accessible locations such as pullboxes, light pole handholes, etc., using a compression connector on the conductor and by insulating and waterproofing (for exterior and underground locations) by one of the following methods:
   a. Cast type splice insulation shall be provided by means of a molded casting process employing a thermosetting epoxy resin insulating material which shall be applied by a gravity poured method or by a pressure injected method. The component materials of the resin insulation shall be in a packaged form ready for convenient mixing after removing from the package. Do not allow the cables to be removed until after the splicing material has completely set.
   b. Gravity poured method shall employ materials and equipment contained in an approved commercial splicing kit which includes a mold suitable for the cables to be applied. When the mold is in place around the joined conductors, the resin mix shall be prepared and poured into the mold. Do not allow cables to be moved until after the splicing materials have completely set.

J. Identification: Refer to Section 26 05 00.

K. Firestopping: as manufactured by 3M Fire Protection Products or equal.

1. Fire-rated and smoke barrier construction: Maintain barrier and structural floor fire and smoke resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound vibration absorption, an at other construction gaps.
2. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetration type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall penetrations. Systems or devices must be asbestos free.

PART 3 - EXECUTION

3.01 REFER TO BASIC ELECTRICAL REQUIREMENTS - SECTION 26 05 00 FOR WORK UNDER THIS SECTION.

3.02 TESTS

A. Testing and Inspection: See Section 26 08 00 - Testing.

END OF SECTION

SECTION 26 5101
LIGHTING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Luminaires (i.e., lighting fixtures): Refer to the Luminaire Schedule and provide a complete and working facility Lighting System. Catalog numbers in the Luminaire Schedule are design series references and may not represent the exact catalog number as specified or as required for particular installations. Provide complete luminaires to correspond with the number of LEDs, power supply, wattage, mounting hardware, ceiling type, trim, size, and special requirements as specified in the Luminaire Schedule for each luminaire type. Additional features, accessories, and options specified, described, scheduled, or necessary for installation shall be included.

B. LEDs and power supplies.

C. Lighting controls, including occupancy sensors. See Section 26 57 00 for Low Voltage Lighting Control System.

D. Exit and Emergency Egress lighting where indicated and where required.

E. Supports for outlet boxes and luminaires, including seismic restraint slack wires for recessed luminaires in suspended ceilings per code and backing in walls as required to keep luminaires secure and level.

1.02 INCORPORATED DOCUMENTS

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

B. Section 26 05 00 and 26 27 00 apply to all work in this section.

C. Division 03: Concrete (Bases for pole-mounted luminaires as noted in Luminaire Schedule).

D. Division 09: Painting and Finishes (cutting of holes in finished surfaces for recessed luminaires).

1.03 RELATED WORK

A. Ceiling Access panels where required for access to equipment, outlets, transformers, etc., located above suspended ceilings, sheet rock or plaster ceilings. Coordinate with the Architect and other trades.

1.04 SUBMITTALS

A. Submit under provisions of Division 1 and Section 26 05 00.

B. Submit (6) six sets of submittals for review by the project team unless otherwise noted in these specifications. The submittals shall include the following information:
   1. Product Index: The following information shall be included in the product index.
      a. Luminaire Type. The index shall list, in alphabetical order, each luminaire type per the Luminaire Schedule.
      b. Manufacturer’s Catalog Number. Outstanding information required to make a complete catalog number shall be clearly identified in the index.
      c. Where a pole is included with the luminaire, include the catalog number of the pole in addition to that of the luminaire.

d. LED Data. Provide the Manufacturer's name for each LED array including wattage, color temperature, lumen output, and color rendering index.

2. Manufacturer's literature for every luminaire listed on the Luminaire Schedule.
   a. Catalog Information:
      1) Luminaire Data Sheet: The manufacturer's cut sheet shall include the following:
         (a) Photometrics: Candlepower distribution curve or table with horizontal readings at 0, 22.5, 45, and 90 degrees and vertical readings from 0 to 180 degrees in 5 degree increments in accordance with the Illuminating Engineering Society published test procedures.
         (b) Catalog Number Nomenclature
         (c) Coefficient of Utilization Tables
         (d) Luminaire Line Drawing
         (e) Power supply (each type)
3. Data sheets for electronic ballasts and power supplies. Indicate luminaire types on applicable ballast/power supply data sheets.
4. Data sheets for wallbox controls and other products specified in this section.
5. Shop Drawings:
   a. Provide shop drawings of suspension details for luminaires recessed in, mounted on, or suspended from hung ceilings. Details shall clearly illustrate proposed methods for supporting luminaires independent of the suspended ceiling system.
   b. Detailed shop drawings of all cove or box mounted luminaires containing the following information:
      1) Exact field measured length (clear inside dimension) of cove pocket or box.
      2) Exact luminaire length and arrangement of luminaires in cove or box.
   c. Detailed shop drawings of pendant mounted luminaires constructed with linear metal housings containing the following information.
      1) Support mechanism, including swivel canopies.
      2) Trim details.
      3) Closure piece details.
      4) Pattern configurations.
6. Samples:
   a. Provide samples of luminaire trim where "Finish as selected by Architect" is indicated on the Luminaire Schedule. Submit two finish samples, 75 mm x 75 mm (3" x 3") minimum, of all custom color, decorative metal, or anodized aluminum finishes. Samples must be approved in writing by the Architect prior to ordering.

C. For Any Luminaires Substituted For Those Specified:
   1. Refer to Division 1 - Product Requirements, for all substitution procedures.
   2. Provide Independent Testing Laboratories, Inc., or equal, photometric test report for each Luminaire type and lamp combination listed on the Luminaire Schedule. Test reports shall be based on Illuminating Engineering Society published test procedures and shall contain polar coordinate candlepower distribution curves in five lateral planes for luminaires with asymmetric distributions and luminaire luminance data for vertical angles above 45 degrees from nadir. Test results shall indicate luminaire efficiency for the lamp and aperture assembly specified. luminaires with efficiencies more than 2% below the values of specified luminaires are not acceptable and will be rejected.
   3. Provide photometric calculations for each room or area where a substituted luminaire is proposed. Such calculations shall be made using comprehensive lighting software, such as AGi32, and include point-by-point illuminance values at IES recommended heights, average illuminance, and maximum-to-minimum and average-to-minimum uniformity ratios. Room dimensions, configurations (including sloping ceilings), room surface reflectances, light loss factors, and heights of suspended luminaires shall match the heights specified in the contract documents.
   4. Due to the variety of lumen outputs and light distributions of LED Luminaires, substitutions will require additional review on the part of the Engineer or Architect to ascertain the equivalency of the

substituted luminaires. Substitutions will be reviewed to determine their aesthetic, construction, and photometric equivalency to maintain similar design impact and performance in their intended environment. The Engineer and Architect have not included such unknown and unquantifiable review time in their scope of work and are not compensated by the Owner for such services. The Contractor shall reimburse the Engineer and Architect for labor costs to review substitutions.

5. Prior approval does not guarantee final approval by the Engineer. The Contractor shall be responsible for providing luminaires that meet or exceed the quality and performance of the specified products in their entirety. All deviations in quality and performance from the specified products must be listed and individually signed off by the engineer.
6. The Owner reserves the right to reject a proposed substitution based on their agent's professional judgment as to the utility, quality, performance, visual appropriateness, or finish of substitutions.

1.05 OCCUPANCY SENSORS

A. Equipment Qualification
   1. Wall switch products must be capable of withstanding the effects of inrush current. Submittals shall clearly indicate the method used.
   2. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.
   3. Contractor and Contractor's Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 26.
   4. Contractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit, luminaires, HVAC systems and building management systems.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site and store in unopened cartons in protected location. Inspect products immediately and report all damage accordingly.

1.07 GUARANTEE AND WARRANTIES

A. All work performed under this section must be guaranteed to be free of defects in products or workmanship for one year after date of acceptance by Owner, unless noted otherwise in General Conditions.

B. Warranties:
   1. Electronic power supplies must be warranted against failure for at least five years after date of substantial completion.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide luminaires as indicated in Luminaire Schedule; if conflict exists between Luminaire Schedule and Specifications, the more stringent requirement shall take precedence.

B. Provide luminaires new and complete with mounting accessories, junction boxes, trims, and lamps.

C. Provide products with UL labels appropriate to intended installation conditions, or with labels from other testing laboratories whose results are acceptable to local inspector, showing compliance with UL standards. Labels must be concealed from normal viewing angles.

D. All products of same type by same manufacturer.

2.02 SOLID STATE LUMINAIRES

A. Housing, where applicable:
   1. Steel bonderized or equal rust protected, or aluminum, rigid construction. Minimum gauge thickness shall be as follows:
      a. Interior locations: No. 20-gauge steel, No. 16-gauge aluminum.

B. Finish:
   1. Baked enamel finish (except when otherwise specified).
      a. Concealed interior surfaces (this applies to interior hardware, circuit boards, etc.) matte black.
      b. Concealed exterior surfaces: matte black.
      c. Visible surfaces: color and texture as specified below for each luminaire type or as selected.

C. Light Emitting Diode (LED) requirements:
   1. Correlated color temperature (CCT) for phosphor-coated white LEDs must have one of the following designated CCTs, as specified on the Luminaire Schedule, and fall within the following binning standards.
      a. 3000K defined as 3045 +/- 175K
   2. Color spatial uniformity shall be limited to variations in chromaticity for different directions (i.e. changes in viewing angle) within 0.004 from the weighted average point on the CIE 1976 (u',v') diagram.
   3. Color maintenance shall be limited to a maximum change in chromaticity of 0.007 on the CIE 1976 (u',v') diagram over the lifetime of the product.
      a. Color rendering index: Color rendering index to be determined using ANSI C78.377-2008 and applicable IESNA standards.
      b. Laboratory tests must be produced using specific module(s)/array(s) and power supply combination that will be used in production.
      c. Manufacturers must provide a test report from a laboratory accredited by NVLAP or one of its MRA signatories
   4. Lumen depreciation
      a. Lumen depreciation to be measured using IESNA LM-80-08 and TM-21-11 standard for IES approved method of measuring lumen maintenance of LED light sources.
      b. Phosphor-coated white LED modules/arrays shall deliver at least 70% of initial lumens for a minimum of 50,000 hours when installed in-situ and operated at 100% output and the maximum specified operating temperature.
      c. Colored LED modules/arrays shall deliver at least 50% of initial lumens for a minimum of 50,000 hours when installed in-situ and operated at 100% output and the maximum specified operating temperature.
   5. Acceptable LED manufacturers:
      a. Cree
      b. Nichia
      c. Osram Opto Semiconductors
      d. Philips Lumileds
      e. Xicato

D. Luminaire Efficacy:
   1. Luminaire efficiency shall be measured using IESNA LM-79-08 standard for electrical and photometric measurements of solid state lighting products.
   2. Manufacturer shall provide published luminaire efficacy, which is defined as luminaire light output divided by luminaire input power measured in a 25 degree Celsius environment. Efficacy shall include power supply, thermal, optical, and luminaire losses.

E. Thermal Management:
   1. Solid state luminaire shall not exceed LED manufacturer's maximum junction temperature requirements when operated in-situ at luminaire manufacturer's maximum ambient operating temperature and 100% light output.
   2. Solid state luminaires shall be thermally protected using one or more of the following thermal management techniques:
      a. Metal core board
      b. Gap pad
      c. Internal monitoring firmware
   3. Solid state luminaire housing shall be designed to transfer heat from the LED board to the outside environment.

F. Power Supplies (LED Drivers) requirements:
   1. Power factor of 0.90 or greater for primary application
   2. Input current shall have Total Harmonic Distortion (THD) of less than 20%.
   3. Minimum operating temperature of minus 20 degrees Celsius or below when used in luminaires intended for outdoor applications.
   4. Operating frequency equal to or greater than 120 Hz.
   5. Operate with sustained input variations of +/- 10% (voltage and frequency) with no damage to the driver.
   6. Tolerate sustained open circuit and short circuit output conditions without damage and without need for external fuses or trip devices.
   7. Output shall be regulated to +/- 5% across published load range.
   8. Class A sound rating.
   9. Outputs shall have current limiting protection.
   10. Operate LEDs at constant and regulated current levels. LEDs shall not be overdriven beyond the diode manufacturer's specified nominal voltage and current.
   11. Inrush currents not exceeding peak currents specified in NEMA 410.

G. Solid State Lighting Controls:
   1. Control interface to dimmable power supplies shall consist of one of the following:
      a. Line Voltage Dimming. Controls to be rated for magnetic or electronic low voltage transformer operation.
      b. Low voltage (0-10V) control. Controls to be compatible with either current sink or current source operation.
   2. Dimmable LED power supplies shall use pulse width modulation (PWM) or constant current reduction (CCR) to regulate power to LEDs.
      a. PWM power supplies shall have 12-bit or greater resolution to obtain flicker-free operation throughout their dimming range.
      b. PWM power supplies shall be provided in luminaires that will be dimmed lower than 40% and must maintain consistent color temperature.
      c. CCR power supplies shall be provided in areas that have strict electromagnetic interference (EMI) requirements, high motion activity, or rotating machinery.

H. System Installation
   1. Hardwired connections to solid state luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed or shorted during the installation process.
   2. All solid state luminaires (100% of each lot) shall undergo a minimum eight-hour burn-in test during manufacturing. Solid state lighting installations shall be UL Listed as a low-voltage lighting system including, but not limited to, luminaire, power supply, controller, keypad, and wiring.

I. Warranty

1. Luminaires, drivers, and controllers for solid state lighting systems shall be covered by a five-year warranty against defects in workmanship or material. Warranty shall include in-warranty service program providing for payment of authorized labor charges incurred in replacement of inoperative in-warranty equipment.

2.03 LUMINAIRE CONSTRUCTION

A. Sheet metal: materials and thicknesses shall be 20 gauge (0.7 mm or 0.027") min., free of dents, scratches, oil-can, or other defects.

B. Painted luminaires: exposed weld marks, joints, and seams shall be filled and sanded smooth before finishing.

C. All edges cleaned and dressed to remove sharp edges or burrs.

D. Extrusions: 1/10" min. wall thickness, smooth and free of tooling lines, with cast end plates that exactly match extrusion profiles.

E. Castings: smooth, free of pits, scales, gate marks, or blemishes.

F. Spinnings shall have 1/32" min. thickness, smooth, free of spinning lines or blow-back, with clean edges.

G. Welds: Follow recommendations of American Welding Society. All welds continuous and free of spatter, residue, or warping.

H. No light leaks visible in finished room. Ensure that downlight housings mounted in wood slat ceilings are not visible from below. Field paint exterior of housing with high temperature paint if necessary.

I. Exposed end plates and joiners, with concealed fasteners.

J. End-to-end mounted luminaires: Verify row configurations and provide joiners, aligning splines, and trims to suit.

K. Hardware:
   1. Steel or aluminum interior luminaires: cadmium-plated hardware.
   2. Steel or aluminum exterior luminaires: stainless steel hardware.
   3. Stainless steel luminaires: stainless steel hardware.
   4. Copper alloy luminaires: brass hardware.

L. Raceways: Where used for through wiring, luminaires must be approved for use as raceways.

2.04 RECESSED LUMINAIRES

A. Point-source luminaires: provide pre-wired junction box and thermal protection, and provide slack wires to structure at two diagonal corners.

B. Troffer luminaires: provide hold-down clip at each luminaire corner, and slack wires to structure as detailed on the drawings. The detail will take precedence.

C. Verify ceiling construction details and provide luminaire housings and trims to suit.

D. Non-accessible ceilings: Provide access to junction boxes, ballasts, transformers, and battery packs through luminaire apertures; no access panels in ceiling.

E. Mounting frames: To prevent rusting, provide galvanized steel or cast aluminum frames for installation in damp locations or in plaster ceilings.

F. Adjustable luminaires shall be provided with rotation and tilt locking devices.

2.05 PENDANTS

A. Stem-mounted: 16 mm (5/8") max. o.d. stem with ball swivels at top (and bottom of linear luminaires) to permit 45 degree swing in any direction from vertical. Flat canopy to permit splice inspection after installation. Pendants must permit +/- 13 mm (½") threaded vertical adjustment after installation, leaving at least 6 mm (1/4") thread contact at all points.

B. Provide internal safety cable from luminaire body to stud in outlet box.

C. Cable-mounted: 1 X 7 strand 3/32" diameter stainless steel aircraft cable, factory crimped, independently tested and verified to exceed 1500 pounds.
   1. Verify mounting heights for each luminaire and provide cable lengths and coordinate cord lengths with manufacturer as required prior to ordering luminaires. Provide aircraft cable adjuster nipple with locking jaws.

D. Supports: Carry luminaire weight to structure and provide horizontal bracing from suspension points to ceiling framing to prevent sideways shifting. Provide diagonal seismic restraint wires per code.

2.06 TRIMS

A. Trims must fit tightly and be held in by gravity, spring clips, or mechanical fasteners. Trims must not drop out under normal conditions or seismic forces which do not exceed the design criteria of the building.

B. Aluminum parabolic cones shall be smooth, properly shaped, with Alzak finish in colors as indicated.
   1. No hot spots or lamp images visible at angles shallower than lamp shielding angle.
   2. Self-flange cones must bend parallel to ceiling and cover ceiling hole without additional trim ring. Unpainted flange, shall have the same finish as cone interior.
   3. Cones and louvers for fluorescent luminaires must have permanent anti-iridescence treatment.

C. Lenses, diffusers, and patterned glass: glass or virgin acrylic as noted, with patterns as noted.
   1. Finished thickness 2 mm (1/10") min. unless noted otherwise.
   2. Linear runs over 1200 mm (4'-0") long shall be in equal-length pieces.

2.07 FINISHES

A. Steel Reflectors: Unless otherwise specified, the reflector surface finish shall be of synthetic white enamel or polyester powder coating. Finish shall show no indication of chipping, cracking, flaking or any other sign of loss of adhesion. The initial reflection factor shall be not less than 88 percent averaging 5 randomly selected points on the reflector. After 100 hours of exposure to the radiation of a glass enclosed carbon arc lamp, such as a Fade-O-Meters, the reflectance of the exposed portion shall not be less than 5 percent and finish shall show no appreciable color change. The carbon arc lamp shall be operated at appreciable color change. The carbon arc lamp shall be operated at 13 plus or minus 0.5 amperes at 140 volts. The reflector shall be placed ten inches from the arc and the lamp so ventilated that the temperature of the exposed portion does not exceed 105 degrees F.

B. Aluminum Reflectors: Reflecting surfaces shall be provided with either a specular or diffuse finish as indicated. Reflection factors shall be not less than 83 percent for specular reflecting surfaces. Each reflecting surface shall be protected by dense coating of oxide weighing not less than 5.0 milligrams per

square inch, applied by an anodic process. The reflector shall be given a sealing treatment that will prevent staining of the reflecting surface when subjected to a stain test. All aluminum reflectors & louvers shall be a low iridescent equivalent to that provided by Coil Anodizers.

C. Non-Reflecting Surfaces: Unless otherwise specified, the finish on all non-reflecting exterior surfaces shall be aluminum oxide or aluminum; white, gray or aluminum paint on steel; nickel or chromium plating on copper alloy. Fastening devices shall be nickel, chromium, cadmium or zinc plated. All painted surfaces shall be free of tears, star marks, blisters, pinholes, chipping and any other defects that may impair appearance or serviceability.

2.08 LAMPS

A. Relamp luminaires or replace LED boards and power supplies at no cost to owner if lamps or LEDs exhibit color variation, flicker, or burn out within 90 days of substantial completion date.

B. LEDs:
1. LED quantity, wattage, and color temperature as specified for each LED luminaire.
2. 3500 deg. K color temperature for interior luminaires, 3000 deg. K for exterior luminaires, unless otherwise specified.

2.09 DRIVERS AND TRANSFORMERS

A. General:
1. Verify input voltages and match to branch circuit voltages.
2. Remote drivers or transformers: Provide suitable enclosures and mounting hardware, and install in accessible, ventilated locations.
   a. Secondary wiring: provide number and size of conductors as required, with 3% max. voltage drop between transformer and last lamp.
   b. Keep transformers at least 300 mm (12”) apart and do not stack vertically.

B. LED Drivers:
1. High power factor, thermally-protected.
2. Compatible with LED lamps being used.
3. Capable of dimming LED source without perceptible flicker or stroboscopic effects.

2.10 EMERGENCY LIGHTING AND EXIT SIGNS

A. Emergency lighting:
1. Provide lighting for paths of egress as required by Code.

B. Emergency lighting to consist of wall or ceiling mounted (normally off) lamp head units with battery back-up for 90 minutes of egress lighting output.

C. Description of Systems:
1. Auxiliary battery packs mounted integral to luminaires shall provide no less than 1400 lumen output for a minimum of 90 minutes.
2. Surface mounted luminaire with two (2) reflector-type LED lamps on emergency battery with 90 minute operation.

D. Auxiliary Battery Pack/Ballasts for LED Luminaires:
1. Pure lead or nickel-cadmium, sealed and maintenance-free.
2. Automatic transfer to battery power if supply voltage drops below 75% of normal.
3. Must provide at least 87-1/2% or rated battery voltage for 90 minutes minimum.
4. Internal circuitry to provide continuous “trickle” charge and to prevent deep discharge below 80% of rated battery voltage.

5. Full recharge within 24 hours after restoration of normal power.
6. Charge indicator light visible and test switch operable without tools.
7. Concealed inside luminaire or above ceiling, but replaceable through luminaire aperture.
8. Designed to run one or two lamps per luminaire with minimum of 1400 lumen output.
9. Acceptable manufacturers: Bodine, Dual-Lite, Emergi-Lite, Lithonia, Radiant, Siltron.

E. Recessed emergency luminaire:
1. Cold rolled steel housing.
2. 12v sealed permanent magnet type motor with 30 yr. Service life.
3. Solid state electronics.
4. Integral test switch and pilot light to indicate charge rate.
5. Acceptable manufacturers: Concealite.

F. Exit signs shall be edge or back lit LED, surface-mounted on ceiling or wall, with integral battery packs as described above.
1. Fabricated aluminum construction, no light leaks around canopy. Plain box, with no decorative trim.
2. Letters shall be 20mm (3/4”) stroke, 150 mm (6”) high, with concealed knockouts for left or right arrows, brightness and evenness of illumination per code, green color.
   a. Battery pack contained in basic luminaire housing. No add-on packs or canopies.
   b. Green LED lamps located at interior perimeter for indirect illumination of stencil letters.
   c. Provide finish as specified in the Luminaire Schedule.
   d. Knock out the arrows as indicated on the plans.

G. Emergency luminaires supplied by a separate emergency power source.
1. For luminaires supplied by a separate emergency power source, provide "switched" control of the emergency designated lamps to allow complete "off" control when required by the user. The switched control shall include an automatic transfer feature to automatically turn "on" the emergency designated lamps upon the normal source power failure.
2. Automatic control function shall be provided using a UL 924 listed relay, LVS Inc. #EPC-A or equal, suitable for mounting in a standard 4" square j-box (min. 2.5" deep). Control relay shall provide automatic diagnostic test feature which shall maintain power to the emergency designated lamps for 15 seconds after the room is switched off via the respective light switch or control relay. Emergency designated lamps shall turn off after the 15 second test period and shall come back on when the control device is turned back on to restore full lighting to the space.
3. Provide (1) control module per "switched" zone.

H. Emergency luminaires supplied by a dimmer panel and/or emergency source.
1. For luminaires supplied by a dimmed power source, provide "dimmed" control of the emergency designated lamps to allow normal dimming control with the normal lamps. The dimmed control shall include an automatic transfer feature to automatically turn "on" the dimmed lamps to full light output upon the normal source power failure.
2. Automatic transfer function shall be provided using a UL 924 listed relay, LVS Inc. #EPC-D (2-wire dimmed), #EPC-D-U (3-wired dimmed) or equal, suitable for mounting in a standard 4" square j-box (min. 2.5" deep).
3. Provide (1) transfer module per "dimmed" zone.
4. For DMX-controlled LED emergency lighting, provide control bypass, ETC DEBC series with emergency bypass detection kit - quantity of DEBC outputs as indicated on drawings.

2.11 WALL-BOX DIMMERS

A. Provide dimmer controls as specified on the drawings and in Specifications Section 26 57 00.

B. Ganging and Labeling:
1. Dimmers and matching switches in same location shall be installed in same gang box.

2. Follow dimmer manufacturer's instructions for gang-box sizes. Do not break off fins on dimmers unless noted otherwise.
   a. 1+1, 4+1, 7+1 installation: to gang an even number of small devices without breaking off fins, provide multi-gang box as indicated (1, 4, or 7 gangs) and provide additional single-gang box at end, with ears of single box 70 mm (2-3/4") o.c. from last set of ears on multi-gang box.
   b. When rows of devices are stacked vertically space rows 230 mm (9") o.c. to allow heat dissipation.
3. Provide Lutron multi-gang plates to cover each group of devices.
4. Plates with "-NFB" in catalog number with no fins broken.
5. Plates with "-FB" in catalog number: break off all interior fins on devices, but do not break off outside fins at either end of row.
6. Nova-T: install aligning backplate (provided by Lutron with each multi-gang plate) between wall and devices.
7. Labels: text as indicated 3 mm (1/8") high, all capital letters, engraved on device faceplate, filled with black paint and wiped clean.

2.12 OCCUPANCY SENSORS

A. General
1. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
2. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
3. Wall switch products shall utilize Zero Crossing Circuitry which increases relay life, protects from the effects of inrush current, and increases sensor's longevity.
4. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.
5. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.
6. Where specified, vandal resistant wall switch sensors shall utilize a hard lens with a minimum 1.0mm thickness. Products utilizing a soft lens will not be considered.
7. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.
8. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.
9. Passive infrared sensors shall have a multiple segmented Lodif Fresnel lens, in a multiple-tier configuration, with grooves-in to eliminate dust and residue build-up.
10. Where specified, passive infrared and dual technology sensors shall offer daylighting foot-candle adjustment control and be able to accommodate dual level lighting.
11. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.
12. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.
13. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
14. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within ± 0.005% tolerance, 32 kHz within ± 0.002% tolerance, or 40 kHz ± 0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.
15. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.
16. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.

17. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
18. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.
19. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
20. Where specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.
21. All sensors shall have UL rated, 94V-0 plastic enclosures.

B. Circuit Control Hardware - CU
1. Control Units - For ease of mounting, installation and future service, control unit(s) shall be able to externally mount through a 1/2" knock-out on a standard electrical enclosure and be an integrated, self-contained unit consisting internally of an isolated load switching control relay and a transformer to provide low-voltage power. Control unit shall provide power to a minimum of two (2) sensors.
2. Relay Contacts shall have ratings of:
   a. 13A - 120 VAC Tungsten
   b. 20A - 120 VAC Ballast
   c. 20A - 277 VAC Ballast
3. Control wiring between sensors and controls units shall be Class II, 18-24 AWG, stranded U.L. Classified, PVC insulated or TEFLON jacketed cable suitable for use in plenums, where applicable.
4. Minimum acceptable wire gauge from the circuit control hardware relays shall be #14 AWG.

C. Acceptable Manufacturers
1. The Watt Stopper, or Pre-Approved Equal: For pre-approval, provide all the information listed under “submittals” a minimum of ten (10) working days prior to initial bid date.
2. The listing of any manufacturer as "acceptable" does not imply automatic approval. It is the sole responsibility of the Contractor to ensure that any price quotations received and submittals made are for sensors that meet or exceed the specifications and the requirements of the contract documents.
3. Products
   a. All products shall be Watt Stopper product numbers:
      1) Ceiling sensors: WT-605, WT-600, WT-1105, WT-1100, WT-2205, WT-2200, WT-2250, WT-2255, W-500A, W-1000A, W-2000A, W-2000H, WPIR, DT-200, DT-205, CX-100, CX-105, CI-200, CI-205
      2) Wall sensors: WI-200, WS-120/277, WA-100, WD-170, WD-180, WD-270, WD-280
      3) Power and Slave Packs: B120E-P, B277E-P, C120E-P, C277E-P, S120/277-P, AT-120, AT-277

PART 3 - EXECUTION

3.01 PREPARATION

A. Architectural Reflected Ceiling Plans and Elevations shall govern exact location and mounting conditions for all luminaires. Contractor shall coordinate luminaire mounting and compatibility with ceiling construction and other trades.

B. Coordinate work with other trades. Location of lighting has priority over location of new framing (except major structural members), ducts, diffusers, sprinklers, speakers, smoke detectors, and other obstructions.

C. If obstructions are encountered which prevent installation of luminaires according to drawings, notify Architect immediately and do not proceed until conflict has been resolved.

D. Coordinate the location of luminaires in mechanical or unfinished spaces. Locations shown on Drawings may be adjusted by the Contractor to suit conditions. Install luminaires to avoid obstructions and maximize light output, 2100 mm (7'-0") min. mounting height.

E. In Elevator Machine Rooms, locate the luminaires so that the illumination level at the floor is not less than 200 lx (19 fc). Illuminate areas in front of and behind (if accessible) controllers, machines and other elevator equipment.

F. In Elevator Pits, locate the luminaires so that the illumination level at the pit floor is not less than 100 lx (10 fc).

G. Coordinate the location of any exposed conduit used to feed luminaires with the Architect prior to installation.

3.02 INSTALLATION

A. General:
1. Contractor shall be responsible for handling and installation of luminaires including all supports, hangers and hardware necessary for a complete installation. Luminaires shall be clean, plumb, level in straight lines, without distortion. Luminaires must be installed so they do not shift during relamping or adjustment. Remedy any light leaks which may develop after installation of recessed or enclosed luminaires.
2. Install luminaires at locations and heights as indicated, in accordance with luminaire manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation", NEMA standards, and with recognized industry practices to ensure that luminaires fulfill requirements.
3. Point-source luminaires shall be located as dimensioned, or in center of tile or on tile joint as drawn; 6 mm (1/4") max. off-center tolerance.
4. Linear luminaires shall have 3 mm (1/8") max. horizontal or vertical alignment variation in any 5 m (16-ft.) portion of run.
5. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds. 486 A and B, and the National Electrical Code.
6. Clean luminaires of dirt and construction debris upon completion of installation. Clean fingerprints and smudges from lenses.
7. Remove and replace luminaires that may have been damaged during construction at no additional cost to the Owner.
8. Protect installed luminaires from damage during remainder of construction period.
9. Provide equipment grounding connections for luminaires as indicated. Tighten connections to comply with tightening torques specified in UL 486 A to assure permanent and effective grounds.
10. Install luminaires, lamps, lenses, etc., after building is enclosed, weather tight and environmental conditions are nominally the same as expected for the complete spaces. All lenses, glass, reflectors, and refractors shall be clean and free of chips, cracks, and scratches.
11. All wall mounted luminaires and all ceiling mounted surface luminaires including exit lights shall be fed through a luminaire Stud/Hickey/Nipple assembly and with provisions to prevent luminaire turning.
12. Installation of exit signs shall be coordinated with other trades to ensure signs are visible as intended.
13. All junction box cover plates for the lighting branch circuit system shall be clearly marked with a permanent ink felt pen identifying the branch circuit and control relay (panel number, circuit number, lighting control cabinet designation and control relay number) contained in the box.

14. Provide permanently affixed adhesive labels with machine printed lettering (min. 1/8" high) at junction boxes serving luminaires that are supplied by (2) electrical sources (i.e. normal and emergency lighting). Label to read "CAUTION - This luminaire is powered by (2) separate sources. The normal power source breaker and the emergency power source breaker must be turned off before servicing this luminaire."

B. Recessed Luminaires:
   1. The contractor shall verify the fire rating of the ceiling system and wall in which the luminaires are to be mounted. Where luminaires are installed in fire rated ceilings or walls, provide fire rated enclosures around and over luminaires to maintain ceiling fire rating. No additional cost shall be allowed for failure to include such enclosures and installation in the bid.
   2. Holes for Recessed Point-Source Luminaires: Cut holes to follow luminaire housings exactly so no gaps will be visible after trims are installed.
   3. Install bottom of housing aligned with finished ceiling.
   4. Keep ceiling insulation at least 75 mm (3") away from luminaires. Exception: luminaires with insulated contact (IC) rating shall be permitted to be in contact with insulation.
   5. Install trims after painting of spaces. Install trims tightly, with no gaps or light leaks.
   6. Seismic restraints: Provide and install slack wires and hold-down clips per code.
   7. Wallwashers:
      a. Orient wallwasher housings according to manufacturer’s instructions to maximize brightness on the upper portion of the wall.

C. Ceiling-Mounted and Pendant Luminaires:
   1. Provide support for outlet boxes and suspension points so luminaires can be installed securely, including seismic supports per code.
      a. Luminaire weight less than 23 kg (50 lb) at each suspension point: hang from strap or stud on outlet box, or at non-feed points, provide 1/4"-20 stud projecting 20 mm (3/4") below ceiling.
      b. Luminaire weight 23 kg (50 lb) or more at each suspension point: hang directly from structure, either independent of outlet box or from stud extending through outlet box to structure, unless the outlet box is listed for not less than the weight to be supported. Boxes used as the sole support of luminaires weighing more than 50 pounds must be listed and marked by the manufactuer with the maximum weight.
   2. Pendants:
      a. Provide horizontal bracing from suspension points to ceiling framing to prevent sideways shifting.
      b. Provide diagonal seismic restraint wires above ceiling per code.
      c. Furnish suspended luminaires with universal joint type hanger canopy (and longitudinal sway adapter at each stem connection point for linear luminaires), to permit 45 degree swivel on 360 degree circle from Nadir at canopy (and 45 degree longitudinal movement at sway adapter).
      d. Luminaires over 450 mm (18") wide shall be provided with supports at all corners.
      e. Install pendants plumb and level.
      f. Verify luminaire weights and provide backing in ceiling as required.

D. Wall-Mounted Luminaires:
   1. Mounting heights shown on Drawings are measured from finished floor to centerline of outlet box or recessed housing, unless otherwise noted.
   2. Verify luminaire weights and provide backing in wall as required. Luminaires must not droop or tilt away from wall.
   3. Wet locations: install sealant between luminaire and outlet box.
   4. In circulation areas, wall-mounted luminaires must not project more than 100 mm (4") from wall if mounted above 685 mm (27") and below 2030 mm (80").

3.03 LIGHTING CONTROLS

A. Install controls so that all operable parts are at 48 inches (1220 mm) maximum height.

B. See Section 26 5700 for low voltage lighting control system requirements.

3.04 DELIVERY, STORAGE, & HANDLING:

A. Deliver luminaires in factory-fabricated containers or wrappings, which properly protect luminaires from damage. Inspect luminaires immediately upon delivery to ensure correct shipment without damage.

B. Store luminaires in original packaging. Store inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity, laid flat and blocked off ground.

C. Handle luminaires carefully to prevent damage, breaking, and scoring of finishes. Do not install damaged units or components; replace with new. Protection wrapping on louvered (parabolic) luminaires shall not be removed until luminaires are ready for operation.

3.05 SEQUENCING AND SCHEDULING:

A. General:
   1. Coordinate with other work including wires/cables, electrical boxes and fittings, and raceways, to properly interface installation of luminaires with other work.
   2. Sequence lighting installation with other work to minimize possibility of damage and soiling during remainder of construction.

3.06 PROJECT CLOSEOUT

A. Clean luminaires and remove plaster and paint spatters.

B. Clean fingerprints and dust from downlight reflectors. Refer to manufacturer’s instructions.

C. Verify that luminaires and controls are working at time of final acceptance by Owner.
   1. Repair or replace lighting control devices that are inoperable.
   2. Repair or replace LED modules or entire LED luminaires that are inoperable.
   3. Repairs and/or replacements shall be at no additional cost to the Owner.

D. Test emergency lighting system for 90 minutes in presence of Owner's representative, check each luminaire for proper operation at end of 90-minute test, then recharge for 24 hours and briefly test each luminaire again for proper operation.

E. Install and aim adjustable lighting as directed by Architect.
   1. Provide personnel, lifts, ladders, and walkie-talkies as required.
   2. Aiming will occur at night, outside of normal working hours, at times as approved by the Architect.

F. Prepare two copies of a Lighting Systems Maintenance Manual consisting of the following in a hardcover binder. Deliver to Architect. After review, Architect will deliver one copy to Owner.
   1. One complete set of approved submittals, including product data and shop drawings.
   2. Luminaire cleaning instructions, including chemicals to be used or avoided.
   3. Instructions for code-required testing and maintenance of emergency lighting system.

END OF SECTION

SECTION 26 5700
LOW VOLTAGE LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.01 SYSTEM DESCRIPTION

A. Furnish all labor, materials, apparatus, tools, equipment transportation, temporary construction and commissioning services as indicated on the Drawings or described in these Specifications and as required to make a complete working facility lighting control system.

B. Integrated Low Voltage Lighting Control System:
   1. The low voltage lighting control system shall consist of switches, digital occupancy sensors, daylighting sensors, room controllers, and LMCS system configuration software.
   2. The system shall accept program changes from the LMCS system configuration software for date and time, location, holidays, event scheduling, button binding and group programming.

C. Requirements are indicated in Section 26 27 00 for raceways and electrical boxes and fittings required for installation of control equipment and wiring.

D. Provide CBC 2022 compliant seismic installation. See Section 26 05 00 for all certification and submittal requirements.

1.02 INCORPORATED DOCUMENTS

A. Sections 26 05 00, 26 27 00, 26 51 01 and 26 56 01 apply to all Work in this Section.

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

1.03 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of lighting control equipment and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer Qualifications: Installer shall be one who is experienced in performing the Work of this Section, and who has specialized in installation of Work similar to that required for this project.

C. Component Pre-testing: All components and assemblies are to be factory pre-tested prior to installation.

D. System Support: Factory applications engineers shall be available for telephone support.

E. NEC Compliance: Comply with NEC as applicable to electrical wiring Work.

F. NEMA Compliance: Comply with applicable portions of NEMA standards pertaining to types of electrical equipment and enclosures.

G. UL Approvals: Remote panels are to be UL listed under UL 916 Energy Management Equipment and/or UL 508 Industrial Control Equipment.

H. CSA Approvals: Remote panels are to be CSA listed.

I. FCC Emissions: All assemblies are to be in compliance with FCC emissions Standards specified in Part 15 Subpart J for commercial and residential application.

J. All System components shall be California Title 24 compliant, where applicable.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00 and 26 05 00.

B. Submit under provisions of Sections 01 33 00 and 26 05 00.
1. Bill of Materials: Complete list of all parts needed to fully install selected System components.
2. Shop Drawings: Submit dimensional Drawings of all lighting control system components and accessories.
3. One Line Diagram: Submit a one-line diagram of the system configuration.
4. Typical Wiring Diagrams: Submit typical wiring diagrams for all components including, but not limited to, relay panels, relays, room controllers, digital low voltage switches, digital occupancy sensors, digital daylighting controls, and border routers.

1.05 MANUFACTURERS

A. Integrated Low Voltage Lighting Control System:
1. The basis of the specified system is the Watt Stopper Digital Lighting Management (DLM) or an equal. Any other system to be considered must submit descriptive information 10 days prior to bid.

B. Prior approval does not guarantee final approval by the electrical engineer. The contractor shall be completely responsible for providing a system meeting this specification in its entirety. All deviations from this specification must be listed and individually signed off by the engineer.

C. The Owner reserves the right to reject a proposed substitution based on his agent’s professional judgment as to the utility, visual appropriateness, or finish of substitutions.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in Manufacturer’s original, unopened, undamaged packages with intact identification labels.

B. Storage and Protection: Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation

1.07 GUARANTEE AND WARRANTIES

A. All Work performed under this Section must be guaranteed to be free of defects in products or workmanship for one year after date of acceptance by Owner, unless noted otherwise in General Conditions.

B. Products Warranty: Manufacturer shall provide a 5 year limited warranty on products within this installation, except where otherwise noted, and consisting of a one for one device replacement.

PART 2 - PRODUCTS

2.01 DISTRIBUTED DIGITAL LIGHTING CONTROL SYSTEM

A. Equipment Required: Lighting Control and Automation system as defined under this section covers the following equipment.
1. Digital Lighting Management (DLM) local network: Free topology, plug-in wiring system (Cat 5e) for power and data to room devices.

2. Wireless Network Bridge and Border Router: Provides Wireless Network Bridges that automatically create BACnet objects for all DLM devices on their local network (room) and communicate that information over a standalone wireless mesh 6LoWPAN network to a Border Router. The Border Router manages the formation and communication of the mesh network, and provides an ethernet network connection to upstream intelligent devices, such as a Segment Manager.
3. Programming and Configuration Software: Optional PC-native application capable of accessing DLM control parameters within a room, for the local network, via a USB adapter, or globally, for many segment networks simultaneously, via BACnet/IP communication.

B. Local Network LMRJ-Series: DLM local network is a free topology lighting control physical connection and communication protocol designed to control a small area of a building.
1. Digital room devices connect to the local network using pre-terminated Cat 5e cables with RJ-45 connectors, which provide both data and power to room devices. Systems that utilize RJ-45 patch cords but do not provide serial communication data from individual end devices are not acceptable.
2. If manufacturer's pre-terminated Cat5e cables are not used for the installation each cable must be individually tested and observed by authorized service representative following installation.

2.02 DIGITAL SWITCHES / DIMMERS

A. Description
1. Two-way infrared (IR) transceiver for use with personal and configuration remote controls. Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 8 button configuration. Wall switches shall include the following features
2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
3. Configuration LED indicator light on each switch that blinks to indicate data transmission.
4. Load/Scene Status LED indicator light on each switch button with the following characteristics:
   a. Bi-level LED
   b. Dim locator level indicates power to switch
   c. Bright status level indicates that load or scene is active
5. Dimming switches shall include seven bi-level LEDs to indicate load levels using 14 steps.
6. All digital parameter data programmed into an individual wall switch shall be retained in non-volatile FLASH memory within the wall switch itself. Memory shall have an expected life of no less than 10 years.
7. Two RJ-45 ports for connection to DLM local network.
8. Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration shall be required to achieve multi-way switching.
9. Switches shall be constructed of non-breakable Lexan on all exposed parts and shall include a matching screwless Lexan wall plate.
10. Individual buttons shall be custom engraved with a maximum of 15 characters (including spaces) on two lines, where shown on plans.
11. Multiple digital switches wired to control the same relay or relay group shall indicate the same status automatically.

B. WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101.

C. Description
1. Intelligent digital switching shall be operating on the DLM Category 5e local network. Switches shall be available in single, dual, quad, or octal (1-button, 2-button, 4-button, or 8-button) designs. All devices shall mount in a standard single-gang box

2. Each button in a switch can be individually programmed. Programming is done by the LMCT-100 handheld configuration tool. Each button can control any one of the following options:
    a. Any individual relay in any single panel.
    b. Any group of relays in any single panel.
    c. Any group of relays in the system.

D. Features
1. Each switch shall also include a locator light illuminating the switch for easy location in the dark.

2.03 DIGITAL OCCUPANCY SENSORS

A. Description
1. Digital Occupancy Sensors - Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.

2.04 DIGITAL PHOTOSENSORS

A. Description
1. Digital Photosensors - Single-zone closed loop, multi-zone open loop and dual-loop daylighting sensors with two-way active infrared (IR) communications can provide switching, bi-level, tri-level or dimming control for daylight harvesting.

2.05 DIGITAL DIMMING / SWITCHING ROOM CONTROLLERS

A. Description
1. Digital controllers for lighting and plug loads automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room and plug load controllers shall be provided to match the room lighting and plug load control requirements. The controllers will be simple to install, and will not have dip switches or potentiometers, or require special configuration for standard Plug n' Go applications. The control units will include the following features.
2. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
3. Simple replacement - Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf.
4. Multiple room controllers connected together in a local network must automatically prioritize each room controller, without requiring any configuration or setup, so that loads are sequentially assigned using room controller device ID's from highest to lowest.
5. Device Status LEDs to indicate:
    a. Data transmission
    b. Device has power
    c. Status for each load
    d. Configuration status
    e. Quick installation features including:
        1) Standard junction box mounting
        2) Quick low voltage connections using standard RJ-45 patch cable
    f. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:
        1) Turn on to 100%
        2) Remain off
        3) Turn on to last level
    g. Each load shall be configurable to operate in the following sequences based on occupancy:
        1) Auto-on/Auto-off (Follow on and off)
        2) Manual-on/Auto-off (Follow off only)

h. The polarity of each load output shall be reversible, via digital configuration, so that on is off and off is on.
i. BACnet object information shall be available for the following objects:
   1) Load status
   2) Electrical current
   3) Total watts per controller
   4) Schedule state - normal or after-hours
   5) Demand response control and cap level
   6) Room occupancy status
   7) Total room lighting and plug loads watts
   8) Total room watts/sq ft
   9) Force on/off all loads
j. UL 2043 plenum rated
k. Manual override and LED indication for each load
l. Dual voltage (120/277 VAC, 60 Hz), or 347 VAC, 60 Hz (selected models only). 120/277 volt models rated for 20A total load, derating to 16A required for some dimmed loads (forward phase dimming); 347 volt models rated for 15A total load; plug load controllers carry application-specific UL 20 rating for receptacle control.
m. Zero cross circuitry for each load
n. All digital parameter data programmed into an individual room controller or plug load controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.

B. On/Off Room Controllers shall include:
   1. One or two relay configuration
   2. Efficient 150 mA switching power supply
   3. Three RJ-45 DLM local network ports with integral strain relief and dust cover
   4. WattStopper product numbers: LMRC-101, LMRC-102

C. On/Off/Dimming enhanced Room Controllers shall include:
   1. Real time current monitoring
   2. Multiple relay configurations
      a. One, two or three relays (LMRC-21x series)
      b. One or two relays (LMRC-22x series)
      c. Efficient 250 mA switching power supply
      d. Four RJ-45 DLM local network ports with integral strain relief and dust cover
      e. One dimming output per relay
         1) 0-10V Dimming - Where indicated, one 0-10 volt analog output per relay for control of compatible ballasts and LED drivers. The 0-10 volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting. (LMRC-21x series)
         2) Line Voltage, Forward Phase Dimming - Where indicated, one forward phase control line voltage dimming output per relay for control of compatible two-wire or three-wire ballasts, LED drivers, MLV, forward phase compatible ELV, neon/cold cathode and incandescent loads. (LMRC-22x series)
         3) Each dimming output channel shall have an independently configurable minimum and maximum calibration trim level to set the dimming range to match the true dynamic range of the connected ballast or driver.
         4) The LED level indicators on bound dimming switches shall utilize this new maximum and minimum trim.
         5) Each dimming output channel shall have an independently configurable minimum and maximum trim level to set the dynamic range of the output within the new 0-100% dimming range defined by the minimum and maximum calibration trim.
         6) Calibration and trim levels must be set per output channel.

7) Devices that set calibration or trim levels per controller are not acceptable.
8) All configuration shall be digital. Devices that set calibration or trim levels per output channel via trim pots or dip-switches are not acceptable.

f. Each load shall have an independently configurable preset on level for Normal Hours and After Hours events to allow different dimmed levels to be established at the start of both Normal Hours and After Hours events.
g. Fade rates for dimming loads shall be specific to bound switch buttons, and the load shall maintain a default value for any bound buttons that do not specify a unique value.
h. The following dimming attributes may be changed or selected using a wireless configuration tool:
1) Establish preset level for each load from 0-100%
2) Set high and low trim for each load
3) Set lamp burn in time for each load up to 100 hours
i. Override button for each load provides the following functions:
1) Press and release for on/off control
2) Press and hold for dimming control
j. WattStopper product numbers: LMRC-211, LRMC-212, LRMC-213, LMRC-221, LMRC-222

D. Plug Load Room Controllers shall include:
1. One relay configuration with additional connection for unswitched load
2. Configurable additive time delay to extend plug load time delay beyond occupancy sensor time delay (e.g. a 10 minute additive delay in a space with a 20 minute occupancy sensor delay ensures that plug loads turn off 30 minutes after the space is vacated).
3. Factory default operation is Auto-on/Auto-off, based on occupancy
4. Real time current monitoring of both switched and un-switched load (LMPL-201 only)
5. Efficient switching power supply
a. 150mA (LMPL-101)
b. 250mA (LMPL-201)
c. RJ-45 DLM local network ports
1) Three RJ-45 ports (LMPL-101)
2) Four RJ-45 ports (LMPL-201)
d. WattStopper product numbers: LMPL-101, LMPL-201.

2.06 CONFIGURATION TOOLS

A. A wireless configuration tool facilitates optional customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a USB interface.

B. Features and functionality of the wireless configuration tool shall include but not be limited to:
1. Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
2. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.
3. Must be able to read and modify parameters for room controllers, occupancy sensors, wall switches, daylighting sensors, network bridges and relay panels, and identify room devices by type and serial number.
4. Save up to eight occupancy sensor setting profiles, and apply profiles to selected sensors.
5. Temporarily adjust light level of any load(s) on the local network, and incorporate those levels in scene setting. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
6. Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls.
7. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
8. Verify status of building level network devices.

C. WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100

2.07 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE

A. PC-native application for optional programming of detailed technician-level parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP communication.

B. Additional parameters exposed through this method include but are not limited to:
   1. Occupancy sensor detection LED disable for performance and other aesthetic spaces where blinking LEDs present a distraction.
   2. Six occupancy sensor action behaviors for each controlled load, separately configurable for normal hours and after hours modes. Modes include: No Action, Follow Off Only, Follow On Only, Follow On and Off, Follow On Only with Override Time Delay, Follow Off Only with Blink Warn Grace Time, Follow On and Off with Blink Warn Grace Time.
   3. Separate fade time adjustments per load for both normal and after hours from 0 - 4 hours.
   4. Configurable occupancy sensor re-trigger grace period from 0 - 4 minutes separate for both normal hours and after hours.
   5. Separate normal hours and after hours per-load button mode with modes including: Do nothing, on only, off only, on and off.
   6. Load control polarity reversal so that on events turn loads off and vice versa.
   7. Per-load DR (demand response) shed level in units of percent.
   8. Load output pulse mode in increments of 1second.
   9. Fade trip point for each load for normal hours and after hours that establishes the dimmer command level at which a switched load closes its relay to allow for staggered On of switched loads in response to a dimmer.

C. Generation of reports at the whole file, partial file, or room level. Reports include but are not limited to:
   1. Device list report: All devices in a project listed by type.
   2. Load binding report: All load controller bindings showing interaction with sensors, switches, and daylighting.
   3. BACnet points report: Per room Device ID report of the valid BACnet points for a given site's BOM.
   4. Room summary report: Device manifest for each room, aggregated by common BOM, showing basic sequence of operations.
   5. Device parameter report: Per-room lists of all configured parameters accessible via hand held IR programmer for use with O&M documentation.
   6. Scene report: All project scene pattern values not left at defaults (i.e. 1 = all loads 100%, 2 = all loads 75%, 3 = all loads 50%, 4 = all loads 25%, 5-16 = same as scene 1).
   7. Occupancy sensor report: Basic settings including time delay and sensitivity(ies) for all occupancy sensors.

D. Network-wide programming of parameter data in a spreadsheet-like programming environment including but not limited to the following operations:
   1. Set, copy/paste an entire project site of sensor time delays.
   2. Set, copy/paste an entire project site of sensor sensitivity settings.
   3. Search based on room name and text labels.
   4. Filter by product type (i.e. LMRC-212) to allow parameter set by product.
   5. Filter by parameter value to search for product with specific configurations.

E. Network-wide firmware upgrading remotely via the BACnet/IP network.

1. Mass firmware update of entire rooms.
2. Mass firmware update of specifically selected rooms or areas.
3. Mass firmware upgrade of specific products.

F. WattStopper Product Number: LMCS-100, LMCI-100

PART 3 - EXECUTION

3.01 PREPARATION

A. Do not begin installation until measurements have been verified and work areas have been properly prepared.

B. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PRE-INSTALLATION MEETING

A. Manufacturer shall provide a factory authorized representative to provide a functional overview of the lighting control system prior to products being installed.
1. Discuss functionality and integration of all products per design requirements.
2. Confirm location of occupancy sensors and photocells as required.
3. Confirm low voltage control wires meet specification.
4. Explain adjustment options and verify specification requirements for each device.

3.03 INSTALLATION

A. Install system in accordance with the approved system shop drawings and manufacturer's instructions.

B. Install no wireless devices within 10’-0” radius of the border router, including Wattstopper wireless network bridges and third-party devices such as wi-fi access points, security systems, RFID tagging equipment, etc. Coordinate this requirement with the general contractor and all trades.

C. Install all room/area devices using manufacturer's factory-tested Cat 5e cable with pre-terminated RJ-45 connectors.
1. If pre-terminated cable is not used for room/area wiring, each field-terminated cable shall be tested following installation and testing results submitted to the Manufacturer's Representative for approval prior to proceeding with the Work.
2. If fixtures have internal DLM Control Modules, ensure that they are also connected with Cat 5e cable.
3. Install all room to room network devices using manufacturer-supplied LM-MSTP network wire or wireless devices. Network wire substitution is not permitted and may result in loss of product warranty.
4. Low voltage wiring topology must comply with manufacturer's specifications.
5. Route network wiring as indicated on the Drawings as closely as possible. Document final wiring location, routing and topology on as built drawings.

D. All line voltage connections shall be tagged to indicate circuit and switched legs.

E. Test all devices to ensure proper communication.

F. Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings. Adjust time delay so that controlled area remains lighted while occupied.

G. Provide written or computer-generated documentation on the configuration of the system including room by room description including:
   1. Sensor parameters, time delays, sensitivities, and daylighting setpoints.
   2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
   3. Load Parameters (e.g. blink warning, etc.)

H. Post start-up tuning - Adjust sensor time delays and sensitivities to meet the Owner's requirements 30 days from beneficial occupancy. Provide a detailed report to the Architect / Owner of post start-up activity.

I. Tighten all panel Class I conductors from both circuit breaker and to loads to torque ratings as marked on enclosure UL label.

J. All Class II cabling shall enter enclosures from within low-voltage wiring areas and shall remain within those areas. No Class I conductors shall enter a low-voltage area.

K. Run separate neutrals for any phase dimmed branch load circuit. Different types of dimming loads shall have separate neutral.

L. Verify all non-panel-based lighting loads to be free from short circuits prior to connection to room controllers.

3.04 PROGRAMMING

A. Perform the following inspections and prepare reports.
   1. Verify Class I and II wiring connections are terminated properly by validating system performance.
   2. Set IP addresses and other network settings of system front end hardware per facilities IT instructions.
   3. Verify / complete task programming for all switches, dimmers, time clocks, and sensors.
   4. Verify that the control of each space complies with the Sequence of Operation.
   5. Correct any system issues and retest..

3.05 SYSTEM STARTUP

A. The Manufacturer shall provide a factory authorized technician to commission and confirm proper installation and operation of all system components.

B. Contractor shall provide system documentation after the equipment has been installed:
   1. Lighting control operational summary sheet.
   2. Programming record sheet.
   3. System Installation and Operation Manual shall be provided to the owner.

3.06 PRODUCT SUPPORT AND SERVICE

A. Factory telephone support shall be available at no cost to the Owner following acceptance. Factory assistance shall consist of assistance in solving application issues pertaining to the control equipment.

3.07 TESTS

A. Test under provisions of Section 26 05 00 and 26 08 00.

B. The Owner shall be notified at least three working days in advance of the Contractor's proposed date of the tests to permit scheduling, and to permit witnessing of the tests. The Contractor shall furnish the Owner with three copies of the results of the tests.

C. Circuits: The Contractor shall test each circuit, all controllers, and components of the system for proper operation. The Contractor shall furnish the Owner with three copies of the test results.

D. Operating Test: Contractor shall operate the system in the presence of the Owner proving the proper operation of the system and all components.

END OF SECTION

SECTION 27 0000
TELECOMMUNICATIONS SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. This project includes the provisions for and installation of a complete telecommunications system pathways and wiring infrastructure system for the facility, including all terminations, testing, and all related passive components required for operation.

1.02 WORK INCLUDED

A. Work included in this Section: All materials, labor, equipment, services, and incidentals necessary to install the work as shown on the drawings and as specified hereinafter, including, but not limited to the work listed below.

B. Provide and install a complete and functional data communication system, including voice services via VoIP capability, and all necessary passive components, to allow full operation of the wiring infrastructure system upon completion.

C. The installation shall include all optical fiber, twisted pair copper, inner-duct, conduit, fiber interconnect / patching equipment, copper interconnect / patching equipment, fiber connectors, copper connectors, splices, fiber patch cords / jumpers, copper patch cords / jumpers, wiring blocks, data outlets, wi-fi access points, and any other equipment specified herein.

D. The installation shall not include any active network components such as routers, switches, hubs, fiber optic transceivers, wireless communications system transceivers, antennae, base stations and concentrators or servers, which shall be supplied by the owner.

E. Upon completion of the installation, this contractor shall test all fiber and copper pathways and record the test results as specified herein. Test results must be delivered to the owner upon completion of project

F. The scope of work under this Section shall include any other work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.

G. Provide CBC 2022 compliant seismic installation. See Section 26 05 00 for all certification and submittal requirements.

1.03 RELATED WORK

A. Division 1 - General Requirements.

B. Division 9 - Finishes.

C. Section 26 05 00 - Basic Electrical Requirements

D. Section 26 27 00 - Basic Electrical Materials & Methods

E. Equipment and work provided by the owner’s network integrator, including owner provided network servers, switches, hubs, optical fiber transceivers, routers, wireless communication system equipment, etc.

1.04 INCORPORATED DOCUMENTS

A. Requirements of the General Conditions, supplementary conditions, and Division 1 Sections apply to the work of this section, unless modified herein.

B. Published specifications, standard tests or recommended methods of trade, industry or government organizations shall apply to work of this section where cited by abbreviations noted below, unless modified herein.
   1. National Electrical Code, latest edition, (NEC), Article 800
   2. ANSI/TIA-492.AAAC-B - Detail Specification for 850-nm Laser-Optimized, 50-um Core Diameter/125-um Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
   3. ANSI/TIA-492.AAAD - Detail Specification for 850-nm Laser- Optimized, 50-µm Core Diameter/125-µm Cladding Diameter Class la Graded-Index Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber
   4. ANSI/TIA-492.CAAB - Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers with Low Water Peak; Current Edition
   5. ANSI/TIA-568.0-D - Generic Communications Cabling for Customer Premises
   6. Underwriters' Laboratories, Inc. (UL), UL 1459, UL 1863.
   7. ANSI/TIA-568.1-D "Commercial Building Communications Cabling Standard"
   8. ANSI/TIA-568.3-D "Optical Fiber Cabling and Components Standard"
   9. ANSI/TIA-569-D "Telecommunications Pathways and Spaces"
   10. ANSI/TIA-568-C.2-1. "Balanced Twisted-Pair Telecommunications Cabling and Components Standard"
   11. ANSI/TIA-606-B.1 - Administration Standard for the Commercial Telecommunications Infrastructure
   12. ANSI/TIA-607-C - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
   13. ANSI/TIA-862-B - Structured Cabling Infrastructure Standard for Intelligent Building Systems
   14. ANSI/TIA-942-A - Telecommunications Infrastructure Standard for Data Centers
   15. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM)
   16. IEEE 802.3 "Carrier Sense Multiple Access With Collision Detection".
   17. IEEE 802.11b "Wireless Network standard"
   18. Owner's telecommunications Standards and Requirements.

1.05 CONTRACTOR QUALIFICATIONS

A. Contractor must possess a valid state Contractor's License and must have successfully performed at least three projects of similar scope, within two years of the date of this bid. Proof of performance shall be in the form of reference sheets, which shall include a brief description of the project, the beginning and ending contract price, the project foreman or superintendent's name, and the name, address, and telephone number of a project contact.

B. Contractor must be able to prove to the satisfaction of Owner that it has significant experience in the installation of optical fiber cable systems. Installation must include installation of optical fiber cable, fiber termination, knowledge of interconnect equipment, and a thorough knowledge of testing procedures. Contractor must provide a minimum of three references supporting its claim of experience for similar projects within the two years prior to this bid. Documentation must be included with the bid documents submitted.

C. Contractor must have been in business and in the business of installing telecommunications systems, continuously, for a period of at least three years, prior to the date of this bid.

1.06 SUBMITTALS

A. General: Comply with the requirements of Section 26 05 00 - Submittals.

B. Submit complete list of all items of materials to be furnished, and installed to the owner for compliance review prior to purchasing the materials. Submittals shall include:
   1. Complete bill of materials and equipment, including a complete listing of the characteristics of the equipment as specified.
   2. One line diagram indicating all system connections, all closet locations, rack arrangements, cabinets, and workstation outlets.
   3. Rack and communications cabinet layouts and dimensions.
   4. Samples of proposed cable markers and labeling, and patch panel labeling and color-coding.
   5. List of instrumentation to be used for system testing, including certificate of manufacturer's calibration.
   6. ¼ scale plan of all telecommunications rooms and closets, indicating proposed layout of all equipment and cable trays, troughs, and runways.
   7. Manufacturer's warranty application for the indicated project.
   8. Schedule of work completion coordinated with the General Contractor.

C. Submit Contractor’s qualifications as outlined in Section 1.5 above.

D. Submit “as-built” record drawings at the completion of the installation and testing.

E. The Contractor shall submit all testing documentation prior to acceptance of the work by the Owner.

F. Contractor shall submit to the Owner, in writing, 48 hours advance notice when testing of optical fiber cable will begin.

1.07 GENERAL REQUIREMENTS

A. The telecom communications system shall consist of three components:
   1. An optical fiber backbone.
   2. Twisted pair copper voice and data cabling.
   3. Twisted pair copper cabling for wireless access points.

B. Each building shall be connected via a single multi-strand single mode optical fiber cable (or composite single mode/multimode cable where indicated on the drawings) to the building MDF. Individual Intermediate Distribution Frames (IDF) shall be located as indicated on the Drawings for additional termination/patching of horizontal copper station cabling. Each optical fiber cable shall originate at the building MDF and shall be terminated at its respective IDF.

C. All optical fiber cables shall be enclosed in innerduct installed in conduit.

D. All copper backbone cables shall be routed along with the fiber cable, shall originate at the MDF, and shall terminate in their respective IDF.

E. From each IDF, one or more twisted-pair copper cables shall be routed to each data outlet location, and to each wireless antenna location, as indicated on the drawings.
   1. The wiring system shall be provided and installed per TIA / EIA-568 wiring topology and shall be Category 6A rated.
   2. Unshielded twisted pair (UTP) cable, installed for high-speed data application, shall not exceed 295 feet in length between terminations.

F. Terminations:

1. All fiber strands shall be terminated with connectors and land on fiber interconnect equipment.
2. All data cables and wireless communications cables shall be terminated on modular patch panels.
3. All voice cables shall be terminated on modular patch panels, or on wiring blocks where indicated on the drawings.
4. All active equipment will be provided and installed by the owner.

G. The MDF and IDF will also house active data distribution equipment provided by the owner, possibly including but not limited to local area network hubs and switches, optical fiber transceivers, wireless communication systems base stations and concentrations routers, and servers. This Contractor shall coordinate with Owner's network integrator to ensure that data rack and cabinet layouts fully accommodate all owner-provided equipment.

1.08 FUNCTION AND OPERATION

A. The function of the data communications cable system is to transmit data signals from a central location to multiple individual data outlet locations. Upon completion of the work outlined in this specification, the entire cable system, including cable, and communications outlets shall be tested to (and meet) Category 6A compliance.
   1. Horizontal UTP Category 6A 23AWG copper cabling system shall be guaranteed to exceed all TIA-568-C.2 link and channel performance requirements and be capable of supporting 10G Base-T (802.3an) and ISO/IEC 11801 Class EA applications for a total distance of 100 meters with equipment cords. System shall be guaranteed to meet all Cat 6A requirements for short links and channels down to a 10 foot link (5 meter channel) with a guaranteed 4 dB margin of Alien Crosstalk.
   2. Upon completion of the work, the multimode optical fiber cable system (if multimode is used on this project) shall be capable of 10 Gb/s data rates over a distance of 300 meters and of transmitting signals with a minimum bandwidth of 200 MHz at both 850 and 1300nm. The cumulative signal loss, through connectors, jumpers, couplers, and fiber cable, shall be less than 10 dB.

B. Upon completion of the work, the single mode optical fiber cable system shall be capable of transmitting signals with a bandwidth of up to 500 MHz at both 1310 and 1550 nm. The cumulative signal loss, through connectors, jumpers, couplers, and fiber cable, shall be less than 10dB.

1.09 GUARANTEE

A. The Cabling System shall meet the performance requirements of the ANSI/TIA/EIA-568-C.2 standard. The warranty on the material, services, and operation of the cabling system to this specification must be for a period of at least 15 years. The connecting hardware shall have a lifetime extended warranty against defects in material and workmanship.

B. The warranty must include the following statements regarding the cabling system:
   1. "Will support and conform to TIA/EIA-568-C.2 specifications covering any current or future application which supports transmission over a properly constructed horizontal cabling system premises network which meets the channel and/or basic link performance as described in TIA/EIA-568-C".
   2. "Will be free from defects in material or faulty workmanship for the entire warranty period".
   3. The Contractor shall apply for a warranty from the manufacturer within 60 days from end of project. In order to achieve a warranty the contractor must be in good standing with current training records on file.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Copper & Fiber Cable
   1. BerkTek, Superior Essex, Avaya, Siecor, or equal

B. Fiber Optic Distribution Panels and Interconnects
   1. Leviton, ADC Telecommunications, Siecor, or equal

C. Copper Patch Panels and Devices
   1. Ortronics, Leviton, Avaya, Ortronics, Siemon, or equal

D. Cabinets and Racks
   1. Ortronics, ESW (Encore), Leviton, Homaco, Chatsworth, or equal

E. Innerduct
   1. Eastern, Endot, or equal

F. Firestopping
   1. STI (Specified Technologies, Inc.), 3M, or equal

G. Steel Wire Cable Tray:
   1. Cablofil, Mono-Mesh, GS Metals, or equal

H. Cable Runway:
   1. Cablofil, B-Line, Chatsworth, Mono-System Inc, or equal

I. Fiber Optic Cable Trough:
   1. Ortronics, ADC Telecommunications, or equal

2.02 SYSTEM PERFORMANCE

A. Category 6A (CAT6A) Unshielded Twisted Pair (UTP) Systems
   1. Category 6A 23AWG UTP copper cabling system shall be guaranteed to exceed all TIA-568 link and channel performance requirements and be capable of supporting 10G Base-T (802.3an) and ISO/IEC 11801 Class EA applications for a total distance of 100 meters with equipment cords. System shall be guaranteed to meet all CAT6A requirements for short links and channels down to a 10 foot link (5 meter channel) with a guaranteed 5 dB margin of Alien Crosstalk.
   2. Basis of Design is Berk-Tek Leviton Technologies CX6850 Cat6A Premium UTP System, or approved equal.
   3. Category 6A Performance Parameters, headroom over TIA-568 standard:

INSERTION LOSS	NEXT	PSNEXT	ACR-F (ELFEXT)	PSACR-F (ESELFEXT)
3%	5DB	6DB	10DB	10DB

RETURN LOSS	ACR-N	PSACR	PSANEXT	PSAACR-F
4DB	7DB	7DB	5DB	11DB

A. Connectors

1. Provide mission-critical, modular-type, information connectors/outlets (jacks) for 23-24 AWG copper cable. These connectors shall be individual snap-in style, and exceed compliance with TIA-568 specifications. The connectors shall comply with the following:
   a. Shall be 8-position 8-conductor (8P8C) "RJ45"-style modular jack, Category 6 (CAT6) and Category 6A (CAT6A), with IDC terminals, T568A/B wiring scheme (use T568B), and utilize a non-punchdown simplified manual termination style.
   b. Shall be encased in a die-cast housing to protect from potential EMI/RFI, and utilize a universal Keystone-style insertion footprint as the manufacturer's main "flagship" line of products.
   c. CAT6A connectors shall exceed all component performance requirements for Augmented Category 6 in the ANSI/TIA-568 standard, as well as Class EA requirements as described in ISO/IEC 11801, from 1 MHz to 500 MHz to support the IEEE 802.3an standard for 10GBASE-T network performance.
   d. CAT6 Connectors shall exceed all component performance requirements for Category 6 in the ANSI/TIA-568-C.2 standard, as well as Class E requirements as described in ISO/IEC 11801, from 1 MHz to 250 MHz.Shielded connectors shall utilize the same form factor, design, and tool-less installation process as the unshielded connectors in the product line.
   e. Shall be tested by an Independent testing body such as Intertek (ETL) for component compliance (i.e. "Component rated") to ANSI/TIA-568 and for POE+ applications. Test results shall be published and publicly available without special request.

2.03 MATERIALS

A. Copper Cable:
   1. Inter-building outside-plant cable shall be multi-pair unshielded twisted pair type, #23 AWG, Superior Essex type ANMA or equal. The wiring shall comply with the following:
      a. Maximum DC resistance: 26.5 Ohms Per 1000 feet
      b. Maximum mutual capacitance at 1 kHz: 15.7 nF per 1000 feet
      c. Nominal attenuation @ 1 MHz: 6.7 db per 1000 feet
      d. Characteristic impedance @ 1.0 Hz: 1.0 MHz: 100 Ohms (+) 15%
   2. Interior backbone cable shall be multi-pair unshielded twisted pair type, #23 AWG, Superior Essex AR Series Riser Cable type ARMM or equal. The cable sheath shall be armored and riser-rated (CMR). The cable shall meet ANSI / TIA / EIA-568 standards for 100 ohm category 3 UTP multi-pair backbone cable and also comply with the following:
      a. Maximum DC resistance: 26.5 Ohms per 1000 feet
      b. Maximum mutual capacitance at 1 kHz: 15.7 nF per 1000 feet
      c. Nominal attenuation @ 1 MHz: 7.6 db per 1000 feet
      d. Characteristic impedance @ 1.0 - 16.0 MHz: 100 Ohms, (+) 15%
   3. Inter-building and interior backbone cable shall meet the following requirements.
      a. Cable Conductors specifications:
         1) 23 AWG solid copper conductors.
         2) Individual conductors PVC jacketed.
      b. Cable construction specifications:
         1) Core wrap - Polypropylene film.
         2) Shield - Corrugated aluminum tape bonded to riser-rated jacket.
         3) Cable Jacket marking: Must be legible and shall contain the following information:
         4) Manufacturer's name.
         5) Copper conductor gauge.
         6) Pair counts.
         7) UL and CSA listing.
         8) Manufacturer's trademark.
         9) Category rating.
         10) Sequential foot markings, in 1-foot increments.
         11) Cable jacket shall be gray with black lettering.

4. Horizontal distribution cable in conduit shall consist of four unshielded twisted pairs, #23 AWG, BerkTek Lanmark Cat. 6A type CMR or equal, with the following characteristics: Cable shall be characterized to 750 MHz and UL/ETL Listed by the Manufacturer printed on the cable jacket and package, as well as Intertek (ETL) Verified to TIA-568 Category 6A and ISO/IEC 11801 Class EA requirements for channel, link and component performance to support IEEE 10GBASE-T (802.3an) networks.
5. Horizontal distribution cable, where not installed in conduit in plenum spaces, shall be plenum rated and consist of four unshielded twisted pairs, #23 AWG, BerkTek Lanmark Cat. 6A type CMP or equal, with the following characteristics: Cable shall be characterized to 750 MHz and UL/ETL Listed by the Manufacturer printed on the cable jacket and package, as well as Intertek (ETL) Verified to TIA-568 Category 6A and ISO/IEC 11801 Class EA requirements for channel, link and component performance to support IEEE 10GBASE-T (802.3an) networks..
6. Horizontal cable shall meet the following requirements.
    a. Cable jacket marking: Must be legible and shall contain the following information:
        1) Manufacturer's name.
        2) Copper conductor gauge.
        3) Pair counts.
        4) UL and CSA listing.
        5) Manufacturer's trademark.
        6) Category rating.
        7) Sequential foot markings, in 2-foot increments.
    b. Telecom station (and wireless antenna) cable jacket shall be blue with black lettering and shall be in 1000-foot boxes.
    c. The jacket for telecom cabling serving AV devices and equipment shall be yellow with black lettering and shall be in 1000-foot boxes.
    d. Type CMR cable shall be solid annealed copper with polyolefin insulation round design with flexible web separator with flame retardant PVC jacket.
    e. Type CMP cable shall be same as Type CMR except with type FEP insulation.
7. Data Equipment Inter-Connect patch Cords: Four twisted-pair stranded, Category 6A, 23 AWG copper conductors. Individual conductors PVC jacketed. Each conductor provided with unique color code. Manufacturer terminated on each end with Ortronics or Systimax Category 6A 8-pin / 8-position modular plug to be pinned as per EIA / TIA 568 C. Connector plug shall be polarized to prevent polarity reversal or split pairs, and shall be factory-marked to indicate top of connector. Inter-connect cord shall be UL listed.
8. The Contractor shall complete data interconnects between patch panels and Owner-provided active network electronics.
9. Lengths as required running from the data station cable terminations to the ports on equipment mounted in any rack position. Minimum length shall be 5 feet and the maximum length shall be 15 feet.
10. Voice Cross-Connect Wire (for use on facilities where voice cables are terminated on blocks): One and Two twisted pair, 23 AWG solid copper conductors. Individual conductors PVC jacketed. One pair shall be yellow/blue color code and 2 twisted pairs shall be red/blue and red/orange coded. Must be UL listed for use as cross-connect wire. Provide one 1,000 foot reel of each type for use by Owner.
11. Contractor to assist Owner to perform all voice cross-connects.
    a. Minimum performance specifications:
        1) Cross-connect wire used on "voice" (telephone) cross-connects must meet the EIA/TIA 568 B impedance, attenuation and NEXT requirements for Category 3 horizontal cable.

B. Fiber Optic Cables
1. The mechanical and environmental specifications for fiber optic cable shall be in accordance with ANSI/TIA-492.AAAC-B, Bellcore, FDDI, and NEC sections 770 standards. Optical fiber cables run shall be low-water-peak multimode or singlemode (OS2), and meet all of the requirements delineated within the specifications of ANSI/TIA-568.

a. Cable shall meet/exceed Bellcore TR-TSY-000020, FDDI and NEC sections 770-6(b) and (c) standards.
b. Strand counts shall be per drawings.
    1) Multimode inter-building (exterior) backbone fiber optic cable shall be outside plant rated, with number of multimode strands as noted on the drawings, with dielectric central member, non-armored, water-blocking material, ripcord, dielectric strength member over loose buffer tubes, and polyethylene jacket, Superior Essex TeraGain (11---6G01) Loose Tube Single Jacket All-Dielectric Cable or equal, and shall meet/exceed the following cable characteristics:
        (a) Multimode Core/Cladding size: 50/125um
            (1) Maximum attenuation: 3.5 dB/km @ 850nm, 1.0 dB/km @ 1300 nm
            (2) Minimum bandwidth: 200 MHz-km @ 850nm, 500 MHz @ 1300nm
    2) Multimode indoor backbone fiber optic cable shall be plenum rated, with number of multimode strands as noted on the drawings, with dielectric central member, non-armored, ripcord, dielectric strength member over TB11 buffered fiber, PVC jacket, Superior Essex TeraGain (44---6G01) or equal, and shall meet/exceed the following the following cable characteristics:
        (a) Multimode Core/Cladding size: 50/125um
            (1) Maximum attenuation: 3.75 dB/km @ 850nm, 1.00 dB/km @ 1300nm
            (2) Minimum bandwidth: 200 MHz-km @ 850 nm, 500 MHz-km @ 1300nm
    3) Singlemode inter-building (exterior) backbone fiber optic cable shall be outside plant rated, with number of single mode strands as noted on the drawings, with dielectric central member, non-armored, water-blocking material, ripcord, dielectric strength member over loose buffer tubes, and polyethylene jacket, BerkTek, Superior Essex (11---9T01) Loose Tube Single Jacket All-Dielectric Cable or equal, and shall meet/exceed the following cable characteristics:
        (a) Single mode Core / Cladding size: 8.31/125um
        (b) Maximum attenuation: 0.40 dB/km @ 1310nm, 0.30 dB/km @ 1550nm
    4) Singlemode indoor backbone fiber optic cable shall be plenum rated, with number of single mode strands as noted on the drawings, with dielectric central member, non-armored, ripcord, dielectric strength member over TB11 buffered fiber, PVC jacket, BerkTek, Superior Essex (44---9101) or equal, and shall meet/exceed the following cable characteristics:
        (a) Single mode Core/Cladding size: 8.3/125um
        (b) Maximum attenuation: 0.40 dB/km @ 1310nm, 0.30 dB/km @ 1550nm
    5) Composite singlemode/multimode inter-building fiber optic cable shall be non-plenum rated, with number of single mode and multi-mode strands as noted on the drawings, with dielectric central member, non-armored, water-blocking material, ripcord, dielectric strength member over loose buffer tubes, and polyethylene jacket, Superior Essex TeraGain Loose Tube Single Jacket All-Dielectric Cable or equal, and shall meet/exceed the following cable characteristics:
        (a) Multimode Core/Cladding size: 50/125um
        (b) Multimode maximum attenuation: 3.5 dB/km @ 850 nm, 1.0 dB/km @ 1300nm
        (c) Multimode maximum bandwidth: 200 MHz-km @ 850nm, 500 MHz-km @ 1300nm
    6) All cable assemblies are to be Leviton Opt-X type or equal.
    7) General Fiber Optic Cable Requirements:
        (a) See the Drawings for required fiber counts and routing.
        (b) ANSI.EIA/TIA-568.3-D.
        (c) The cable manufacturer must guarantee the supplied single mode fiber optic cable will meet the specifications covering latest following standards and network applications using standard off-the-shelf, non-proprietary network hardware:
        (d) OC-12 625 Mb/s
        (e) OC-48 1024 Mb/s

(f) IEEE 1000 Base SX 1000 Mb/s
(g) ATM 625 Mb/s
(h) ATM 1.2 Gbps
(i) Fibre Channel 1.062 Gbps
(j) Fiber optic cable sheath construction shall be of a tight-buffered MIC style design with integrated strength member.
(k) The fiber optic cable shall have an integrated strength member, which is a high tensile strength dielectric providing axial strength and anti-buckling properties for the fibers.
(l) The fiber optic cable shall utilize aramid yarn as a flexible strength member surrounding the buffered fibers beneath the cable jacket.
(m) The individual fibers in a tight-buffered fiber optic cable shall be placed in groups of 6 or 12 fiber strands per subunit.
(n) The individual subunits shall be color coded for easy identifications.
(o) The cable tensile load rating shall be a maximum of 461 lbf for a 24-fiber count 6-fiber subunit.
(p) The cable minimum bend radius at 0-150lbs pulling or handling load shall be 10 times the outside diameter of the sheath.
(q) The cable minimum bend radius at 151-600 kbs pulling or handling load shall be 20 times the outside diameter of the sheath.
(r) The fiber optic cable shall be low smoke, flame retardant and shall meet the flame test requirements of UL 910. It shall be UL listed as OFNP.
(s) Multimode fiber optic connectors shall be duplex SC.
(t) Fiber optic patch cables SC to SC shall be duplex with an oval over-sheath. Each fiber shall be labeled 'A' or 'B' to provide fast identification of "Transmit" and "Receive" fibers in patching between network electronics and backbone connections. Fiber optic duplex patch cables shall be provided in a 15 foot length as follows:
(u) Avaya FL3EP-EP-15 or Leviton 5LDLC-M05.

C. Data Outlets
1. Cable termination hardware shall be individual; Category 6A rated Leviton (or equal) jacks. The listed product shall have the following characteristics:
a. One eight-position, eight-conductor jack (non-keyed), TIA/EIA-568-C Compliant, wired to T568B, Leviton category 6A.
b. The cover of the information outlet shall be labeled above the jack. The number on the outlet jacks shall coincide with the identification requirements listed in Part 3 of this Section below.
c. The color of all general use jacks shall be blue.
d. The color of all jacks at AV-related devices or racks shall be yellow.
e. The color of all faceplates and blank inserts or visible mounting plates shall match the adjacent power or signal outlet covers on the project (provided under another Section).
f. The devices at outlets and the devices in the patch panels shall be of the same manufacturer and same type.
g. See Drawings for number of jacks at each outlet, jack arrangement, and mounting type.
1) The 8-pin 8-position jacks at terminal blocks and at each 4-pair termination shall be labeled with laser-printed polyester self-laminating wrap-around labels.
(a) Eight-pin 8-position jack label-faceplates;
(1) All labels shall be polyester and white in color;
(2) All labels shall be 1.80-inch in width and 0.375-inch in length;
(3) Labels shall have an adhesive backing;
(4) Labels shall be attached to the faceplate by adhesive and clipping in behind the snap in clear plastic cover;
(5) Labels shall be laser printed with the labeling scheme as specified;

(6) Labels shall be Panduit Pan-CODE Laser Labels (PLL) part EFPL-1, Leviton LabelWare, or equal.
(7) Terminal block designation strip:
(8) All labels shall be polyester;
(9) Labels shall be white in color for 4-pai data station cable terminations, located within a blue plastic label holder;
(10) Labels shall be attached to the designation strip provided with the blue plastic holders;
(11) All labels shall be 7.88 inches in width and 0.50 inches in length;
(12) Labels shall have an adhesive backing;
(13) Labels shall be laser-printed with the labeling scheme as specified;
(14) Labels shall be Panduit Pan-CODE Laser Labels (PLL) part number PLL-22-Y3-1, Leviton LabelWare, or equal.
(15) Labeling for all cable, jacks, and other elements of the telecom cabling system shall follow TIA/EIA-606 Standards. Provide color-coded labels for all wiring blocks as follows:
(16) Interface to Site Cabling - Brown
(17) Interface to Equipment Cabling - Purple
(18) Interface to Horizontal Cabling - Blue
(19) Interface to Telephone Company - Green

D. Termination Hardware at MDF /IDF's (Fiber Optic)
1. Optical Fiber Interconnect Equipment: Interconnect equipment shall be mounted on two or four post equipment racks as indicated on the drawings. Interconnect equipment shall be affixed to the rack by at least (4a) screws. The screws shall be the correct size and thread configuration for the holes in the rack. The screws shall be tightened to the extent that they hold the equipment firmly to the rack, without distorting the equipment or stripping the threads. All optical fiber interconnect devices shall be assembled and installed in accordance with the manufacturer's instructions and recommendations.
2. Fiber Interconnect Equipment shall be of sufficient size to permit termination of all fiber strands, maintaining minimum bend radius for both multimode and singlemode cables, and maintaining required cable storage. In the event that an enclosure must be oversized (number of termination ports) due to manufacturer's product standardization, the next larger available enclosure size shall be utilized.
3. Adapter plates, which accommodate Duplex SC type connectors, shall be provided within each Fiber Optic Distribution Panel (unless otherwise noted on the drawings). Multimode and Singlemode connectors (quantity and type as indicated on the drawings) shall be included on adapter plates.
a. The duplex SC adapter at the main distribution frame (MDF) shall be mounted in a B-A configuration.
b. The duplex SC adapter at each intermediate distribution frame (IDF) shall be mounted in an A-B configuration for cables coming from the MDF, and in a B-A configuration for cables going to an additional IDF (if applicable) further downstream.
1) Fiber optic distribution panels shall be rack-mount type, utilizing Leviton Opt-X fiber System components, or equal, with fiber capacity as indicated on the drawings, equipped with snap-in adapter panels.
(a) Provide quantity of connector panels for complete termination of all fiber strands, complete with duplex SC adapters.
(1) Provide blank connector plates for all spaces not equipped with adapter panels.
(2) All glass strands of each fiber optic cable shall be terminated on Leviton Fast Cure type duplex SC connectors which require no epoxy or heat cure devices, allow re-termination to reduce waste, and have the following characteristics:
(3) Ceramic ferrule

(4) 568SC style
(5) Plastic housing
(6) Low loss - 0.2 db (typical), 0.5 (guaranteed)
(7) All inter-building fiber optic cables (loose tube type) shall be terminated at fiber optic distribution panels using a Leviton 49887 Series (or equal) buffer tube fan-out kit.
(8) Labeling for fiber optic cabling and distribution panels shall match the labeling system for data cabling and hardware.

E. Termination Hardware at MDF / IDF's (Data)
1. All cables installed application shall be terminated in rack-mounted modular patch panels and the entire installation shall be in compliance with TIA/EIA-568-D Category 6A requirements.
2. Patch panels shall be Leviton Category 6A discrete port-type. Port panels shall be certified by the manufacturer as suitable for 1000 Mbps data transmission. Patch panels shall be manufactured of aluminum or steel.
3. Wire management hardware shall be Leviton Versi-Duct 49265 Series, or equal, installed at both the top and the bottom and between each patch panel and along the sides of the rack for patch cable routing and management.
4. Wire managers shall be of sufficient width and depth to permit orderly routing of all patch cables at one hundred percent utilization.
5. Patch panels shall be mounted on equipment racks. Panels shall be affixed to the rack by at least four (4) screws. The screws shall be of the correct size and thread configuration for the holes in the rack. They shall be tightened to the extent that they hold the equipment firmly to the rack, without distorting the equipment or stripping the threads.
6. Patch panel quantity of ports as noted on the drawings.
    a. Termination Hardware at MDF / IDF's (if voice cables are indicated on the drawings to be terminated at 110 blocks rather than at patch panels)
        1) All cables installed for voice application shall be terminated in accordance with industry standards on 110S type wiring blocks.
        2) Avaya or Leviton 110A type wiring blocks with metal backboard category 6A insulation displacement style, or equal shall be installed with sufficient spacing to permit the orderly routing of jumper cables between wiring blocks, and wire management accessories shall be provided for each 110 block.
        3) UTP cable terminating blocks: Compact 110-type or equal Category 6A insulation displacement terminal blocks complete with mounting hardware, connecting blocks, retainers, wire guides, designation strips, etc, UL listed.
            (a) Minimum performance specifications: Must meet EIA/TIA 568-D requirements for Category 6A.
            (b) Avaya Systimax or Leviton Category 6A - 110 Cross Connect System Terminal block kit in 300 pair configuration with vertical cable manager.
            (c) Leviton Category 6A 300-pair Vertical Cord Manager, Basic Unit, with bottom cable tray, with vertical cable manager each side.
            (d) Or equal.
                (1) Wiring blocks, metal frame, and cable managers shall be mounted to plywood backboards. Each frame or wire management accessory shall be mounted such that its horizontal dimension is level. All blocks shall be aligned vertically. Each block shall be affixed to the plywood backboard by means of screws suitable for fastening to plywood. A minimum of four (4) of the mounting holes provided shall be utilized for fastening. Screws shall be tightened to the extent that they hold the frame or wire management accessory snug to the backboard, but not so tight as to distort or damage the device. Wiring blocks shall be terminated in accordance with the manufacturer's instructions and recommendations. Installation of wire management

accessories shall also be conducted in accordance with the manufacturer's instructions and recommendations.

(2) Labeling at wire troughs and for all cable, jacks, and other elements of the voice/data cabling system shall follow TIA/EIA-606 Standards. Provide color-coded labels for all wiring blocks as follows:
(3) Interface to Site Cabling - Brown
(4) Interface to Equipment Cabling - Purple
(5) Interface to Horizontal Cabling - Blue
(6) Interface to Telephone Company - Green

PART 3 - EXECUTION

3.01 CABLE AND WIRE INSTALLATION:

A. This contractor shall be responsible for the provision and installation of all telecom cables including all supports, hangers, and hardware necessary for a complete installation. Under no circumstances shall cables be laid on the suspended ceiling. This contractor shall be responsible for providing and installing all necessary cable support hardware to meet Category 6A requirements. Refer also to Section 26 27 00 Basic Materials & Methods:
   1. T-Bar Suspended Ceilings: Copper station cabling may be run outside of conduits when routed above T-Bar suspended ceilings. Cables installed in this fashion are to be run horizontally in bundles and tied down neatly suspended from J-hooks, and well clear of any light fixtures or other electrical appliances that may affect data transmissions.

B. At each telecom room cables are to be segregated by type, neatly tied together, properly dressed, and routed to the patch panels. All cables shall be tagged.

C. Cable distances from patch panels to data outlet shall not exceed 295 feet. This contractor is responsible to ensure the distance specified is not exceeded.

D. Care shall be exercised in routing both station and backbone/tie cables so as to avoid areas where sources of high levels of EMI (such as electric motors, transformers and fluorescent lighting fixtures) may exist. Maintain a minimum distance of 12" for voltages of 3KVA or less and 36" separation for voltage of 5KVA and more from these sources when run parallel. Cross at 90-degree angles where crossing must occur.

E. Each station cable shall be "home run" (no splices or cross connection points) between jacks and patch panels.

F. All openings or raceway transitions through firewalls and floors shall utilize UL listed fire-rated penetrations.

G. The fiber optical cable manufacturer's installation instructions shall be followed in order to avoid damage during placement within the facility. All fiber optic cable shall be placed within innerduct to provide mechanical protection and to provide visual warning or caution when handling or other work operations are performed adjacent to the installed fiber cable.

H. No more than (2) 90-degree bends shall be allowed on all conduit runs for the horizontal voice/data cabling system, without an intermediate pullbox or junction box.

I. Station cable terminations.
   1. Cable pair twists of Category 6A Cable shall be maintained within 0.5-inch of the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

2. Do not bend Category 6A station cables to a radius of less than 4 times the cable diameter - approximately 2-inches.
3. Allow slack in Category 6A cable bundles at entrances and exits of conduit sleeves and at transitions from "J" hooks to cable trays. Do not exceed maximum 25 pounds of pulling tension on cabling. Never pull cables tight at cable tray transitions; doing so may damage the cables by crimping them on the cable tray side of the bundles.
4. Keep the cable evenly distributed within the cable tray. Do not allow the cables or bundles to be pulled tight against the splines or to be unevenly balanced on one side of the tray.
5. Bundles of station cable in floor slots shall not exceed 2.5 inches in diameter, and shall be spaced 4 inches apart for proper fire stopping of the floor slot.
6. Bundles of station cable in 4-inch floor sleeves shall not exceed a 39 percent fill.

J. Fiber optic cable and termination installation.
1. The Contractor shall place all optical fiber backbone cabling in accordance with these Specifications, and as indicated on the Drawings.
2. Fiber optic cables: After dressing the cable to its final destination, sheath shall be removed to a point that allows the strands to be placed in break out kits to be splayed and terminated in a neat and uniform fashion. At this point all fibers shall be terminated in strict compliance with the manufacturer's submitted instructions.
    a. Cable sheaths shall be clamped to the outside of fiber termination shelf. The cable clamp shall be manufactured by the manufacturer of the termination shelf and shall be designed to clamp outside plant fiber optic cable sheaths.
    b. The tight-buffered sheath cable shall have the OFNR sheath and Kevlar strength members terminated at the cable clamp on the outside of the shelf. Only the buffer tubes and buffered fibers shall continue into the termination shelf.
    c. Provide a minimum of 48-inches of subunit buffer tube and 40 inches of buffered fiber inside of the termination shelf.

K. Where fiber or copper cable enters an equipment room, it shall be affixed to the backboard via "D" Rings and cable ties. All cable shall be neatly bundled, combed, and tied. All exposed cable runs shall be horizontal or vertical, and bends shall comply with manufacturer required minimum cable bending radii.

L. All openings into wall mounted cabinets and fiber optic distribution panels shall have grommets for the protection of cabling.

M. Fiber innerduct shall be installed in accordance with manufacturer's instructions and industry standards. Within the equipment rooms, the innerduct shall extend from the end of conduit to (4) feet above the floor and shall be affixed to the backboard by means of clamps designed for that purpose. Care shall be taken to avoid kinking the innerduct or applying excessive tension during the installation process.
1. Innerduct runs do not have to be continuous throughout. Breaks are acceptable at pull boxes where required. This contractor is responsible for determination of actual lengths of innerduct required. This contractor is responsible for determination of actual lengths of innerduct required. Enough innerduct shall be provided and installed to extend from the fiber service loops at the MDF to the fiber service loops at each IDF. In pullboxes, segments of innerduct shall extend a minimum of (12) inches into the pullbox.

N. During installation of optical fiber cable in conduit, special care shall be taken to avoid damage to the cable. While under pulling tension, the cable shall not be bent into a curve with a radius of less than (20) times the cable diameter. Pulling tension shall not exceed manufacturer's recommended maximum tensile load. Contractor shall utilize a winch with tension control or a "break-away" link designed to break away at or below the recommended maximum tension.

O. A minimum (30) foot service loop shall be provided at each terminal location for all fiber optic cables. Provide service loop via backboard attached cable reels.

P. Each end of gel-filled voice cable shall be dammed at the breakout point-using manufacturer recommended blocking kit. All pairs extending beyond the breakout point and dam shall be cleaned such that no gel remains.

Q. Provide (1) patch cable for each activated jack on the project. Lengths shall be 5ft. minimum or as required for the MDF or IDF design. Patch cords shall be factory tested to ensure compliance with current standards.

R. Provide one fiber jumper for each two strands of fiber at each equipment rack, with duplex SC type connectors unless otherwise noted on the drawings.

S. Labeling: Labeling shall include, but not be limited to:
1. Labeling telecommunications outlet faceplates;
2. Labeling station cables;
3. Labeling terminal blocks;
4. Labeling fiber optic cable sheaths;
5. Labeling fiber optic and copper splice closures;
6. Labeling fiber optic stands;
7. Labeling fiber termination panels;
8. Labeling of telecommunications equipment racks and fiber frames;
9. Labeling of telecommunications pathways, including conduits, steel wire cable trays, cable runway and pullboxes;
10. Labeling of all grounding conductors and ground bars in the Intermediate Distribution Facilities (IDFs) and Main Distribution Frame (MDF).
11. The intent of the final labeling is to allow the Owner or persons contracted by the Owner to identify any part of the structured cabling system through physical identification of the components and their related components at the specified access point without the use of electrical, electronic or mechanical means of identification.
12. Equipment rack and cable tray / pullbox labels:
    a. Equipment Racks shall be clearly labeled as follows:
        1) Labels shall be adhesive backed individual letters and numbers.
        2) Individual letters shall be 3/4*-inch in width and 1-inch in height.
        3) Individual characters shall be self-spacing by simply butting the individual characters against each other in a row.
        4) Characters shall be either white or yellow on a black background.
        5) Labels shall be designed for exposed outdoor applications.
        6) Labels shall be:
            (a) 3M Scotchcal 5003 Non-Reflective Lettering Systems.
            (b) Panduit, PVL100YB.
            (c) Or equal.
                (1) Cable Tray Labeling:
                (2) Cable tray shall be provided with a label clip fastened to the underside.
                (3) Label clip shall be 3.94-inches wide by 0.63-inch high and shall attach to the cable tray without the use of additional fasteners;
                (4) Label clips shall be attached to each label clip:
                (5) All labels shall be polyester with white color;
                (6) All labels shall be at least 3.00 inches in width and 0.38-inch in length;
                (7) Labels shall have an adhesive backing;
                (8) Labels shall be attached to label clips with the adhesive back self-laminating portion;
                (9) Labels shall be laser printed with the labeling scheme as specified;
                (10) Label shall be 0.25-inch high, Ariel San Serif;

(11) Labels shall be Panduit, Pan-CODE Laser Labels (PLL) part number PLL-19-Y2, or equal.
(12) Labeling at Pull Box:
(13) Cover and interior labeling for pull box:
(14) All labels shall be polyester with white color;
(15) All labels shall be at least 1.88- inches in width and 0.83-inch in length;
(16) Labels shall have an adhesive backing;
(17) Labels shall be attached on cover and interior of pullbox at locations indicated on the Drawings with the adhesive back self-laminating portion.
(18) Labels shall be laser printed with a labeling scheme approved by the Owner's Representative.
(19) Label shall be 0.25-inch high, Ariel San Serif;
(20) Labels shall be Panduit, Pan-CODE Laser Labels (PLL) part number PLL-19-Y2, or equal.
(21) Cover and interior labeling for conduit at pull box:
(22) All labels shall be polyester with white color.
(23) All labels shall be at least 1.88- inches in width and 0.83-inch in length;
(24) Labels shall have an adhesive backing;
(25) Labels shall be attached on cover and interior of pullbox with the adhesive back self-laminating portion at location where conduit enters the pullbox.
(26) Labels shall be laser printed with a labeling scheme approved by the Owner's Representative.
(27) Copper station - cable sheath labels:
(28) Copper station cable sheaths at 8-pin 8-position jacks, at junction boxes, enclosures, and pull boxes shall be labeled with laser-printed polyester self-laminating wrap-around labels.
(29) All labels shall be polyester with white color.
(30) All labels shall be at least 1.00- inches in width and 1.33-inch in length; with a 0.5-inch x 1-inch printable area;
(31) Labels shall have an adhesive backing;
(32) Labels shall be attaché to cable sheaths by wrapping around the sheath with the adhesive back self-laminating portion;
(33) Labels shall be laser printed with the labeling scheme as specified;
(34) Cable / outlet / jack / termination identification:
(35) Each copper cable, its associated jack at the outlet, and the associated C-4 connecting block on the terminal block or patch panel shall be labeled with a unique identifier consisting of the following:
(36) The IDF room number where the station cable is terminated, ###.
(37) The end user room number in which the 4-pair cable is terminated and the telecommunications outlet is located, ###.
(38) A 3-digit serial number, rest to 001 for each room, which sequentially identifies each telecommunications jack / cable in a room, ###.
(39) The type of service provided by a Particular cable, either D for data or V for voice.
(40) Example of IDF 107, user room 129, jack /cable number 1 (data cable): 107-129-001-D.
(41) The following are examples of the numbering scheme:
(42) IDF room 1.1, User Rm. 111, Jack/ cable 1, Data line.
(43) 1.1-111-001-D
(44) IDF Number: 1.1
(45) Room Number: 111
(46) Serial Number: 001
(47) Data Line: D

(48) IDF room 1.1, User Rm. 106, Jack / cable, Voice line.
(49) 1.1-106-001-V
(50) IDF Number: 1.1
(51) Room Number: 106
(52) Serial Number: 001
(53) Voice Line: V
(54) Cable identification:
(55) Each fiber optic backbone cable sheath shall be labeled with a unique identifier as shown on the Drawings.
(56) Label the cable sheath at the termination shelf and on the innerduct as the fiber optic cables pass through IDFs and pull boxes.
(57) Each SC connector in each termination shelve shall be labeled with a unique identifier as noted on the Drawings.
(58) Cable sheath identification:
(59) Identify multi-pair copper riser cable sheaths with machine-generated labels at the following locations:
(60) Within 12 inches of the point that the cable exits the top or bottom of the 110P-type terminal block column.
(61) Within 12 inches of the point that the cable enters a splice.
(62) At 40-foot intervals above T-Bar ceilings.
(63) At pull boxes
(64) Within 12 inches of the point that the cable enters or exits wall and floor sleeves.
(65) Warning Tags: At each location where fiber cable is exposed, it shall be marked with warning tags. These tags shall be yellow or orange in color, and shall contain the warning: "CAUTION FIBER OPTIC CABLE". The text shall be permanent, black, block characters, and at least 3/16 high. A warning tag shall be permanently affixed to each exposed cable or bundle of cables, at intervals of not more than (5) feet. Any section of exposed cable, which is less than five (5) feet in length, shall have at least one warning tag affixed to it.

3.02 GROUNDING SYSTEM AND CONDUCTORS

A. Bonding and Grounding:
   1. Communication bonding and grounding shall be in accordance with the NEC and NFPA. Guidelines of ANSI/TIA-607-C shall be followed. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices. Horizontal equipment includes cross connect frames, patch panels and racks, active telecommunication equipment and test apparatus and equipment.

B. Telecommunications Bonding Backbone:
   1. Provide a Telecommunications Bonding Backbone utilizing a minimum #6 AWG bonding conductor (or as shown on drawings) that provides direct bonding between equipment rooms and telecommunications closets. Connect this bonding backbone cable to the main grounding electrode system at the electric service switchboard.
   2. Provide a copper ground bar at each telecommunications equipment room or rack location, connected to the bonding backbone.
   3. Provide a #6 AWG stranded copper cable from each ground bar to each adjacent rack or cable trays system.

3.03 LIGHTNING PROTECTION BLOCKS

A. Protection:

1. Provide protection blocks at each building entry for copper site cable terminations; as manufactured by Circa, or equal.
2. Provide sufficient capacity for protections of all pairs.
3. Materials: As indicated on the Drawings.

3.04 FIRE AND SMOKE PARTITION PENETRATIONS

A. Conduit sleeves shall be provided as part of this contract as a means of routing cables through fire-rated walls and floors. Openings in sleeves and conduits used for system cables and those that remain (empty) spare shall be sealed with an approved fireproof, removable sagging material at completion. Sleeves, which pass vertically from floor to floor, shall be sealed in a similar manner using an approved re-enterable system. Additional penetrations through rated assemblies, necessary for passage of voice/data wiring, shall be made using an approved method and permanently sealed after installation of cables. UL systems must be available for each firestop penetration and included in the submittal. All firestop products must be readily available at local electrical and/or telecom distribution outlets.

3.05 TESTING AND DOCUMENTATION

A. Fiber Optic Cable Test Equipment:
   1. Cable tester shall be NRTL certified for compliance to be used as an Optical Loss Test Set.
   2. Cable testers shall be Optical Power Meter and High Resolution Optical Time Domain Reflectometer (OTDR). The cable tester shall be NRTL certified for compliance to latest TIA/EIA performance requirements at 850, 1300, 1310 and 1550 nm.
   3. Testers shall have been calibrated at least one year prior to use on this project. Calibration must be in accordance to IEC 61315 and IEC 61746 respectively. Contractor to provide proof to Owner if requested.
   4. All testing equipment (OTDR, Light Loss, Splicer etc.) shall be owned by the Contractor. Contractor must prove ownership of equipment if requested
      a. Cable segments and links shall be tested from both ends of the cable for each of the construction phases. (Verify that cable labeling matches at both ends).
         1) The system will not be considered certified until the tester has certified to the Owner that the performance of the physical layer of the system has been fully tested and is operational at the completion of the installation phase.
         2) Testing Procedures:
            (a) Perform each visual and mechanical inspection and electrical test, including optional procedures, stated in NETA ATS, Section 7. Certify compliance with test parameters and manufacturer's written recommendations. Test optical performance with optical power meter capable of generating light at all appropriate wavelengths.
            (b) Prior to testing, all connectors shall be properly cleaned with an approved product manufactured specifically for this purpose.
            (c) Prior to beginning testing, confirm that all testing equipment is fully charged or operating on building power. If the test equipment power levels drop below 50%, recharge unit or continue testing with a different (fully charged) tester.
            (d) All testing shall comply with latest standards, requirements, and procedures of ANSI/TIA/EIA. Tests shall be conducted using ANSI/TIA-526-14A, Method B. Test results evaluation for the panel to panel (backbone) shall be based on the values set forth in ANSI/TIA-568.
            (e) Initially test optical cable with a light source and power meter utilizing latest Tier 1 procedures as stated in TIA/TSB-140.
            (f) Measured results shall be plus/minus 1 dB of submitted loss budget calculations. If loss figures are outside this range, test cable with Optical Time Domain Reflectometer (OTDR) to determine cause of variation. Correct improper splices and replace damaged cables at no charge to the Owner.
         3) Fiber Optic Cables:

(a) Shall be tested bi-directionally for length and attenuation at both the short and long wavelengths as specified in TIA TSB-140.
(b) Single-mode fibers shall be dual wave length and provide attenuated wavelength of the 1310 nm and 1550 nm. 850 nm for single-mode fiber shall not be acceptable under any circumstances. Multimode shall be tested at 850nm and 1300nm.
(c) After installation of connectors, visually inspect each fiber end-face at 10X magnification. Refinish fibers with visible defects and / or striations in the core area.
(d) Demonstrate that measured link loss does not exceed the "worst case" allowable loss, defined as the sum of the connector losses (based on number of mated connector pairs at the EIA / TIA 568 maximum allowable loss of 1.5dB per mated pair), the optical fiber loss (based on length) and the EIA / TIA 568 maximum allowable loss (3.75dB/km @ 850nm and 1.0dB/km @ 1300nm).
(e) Strands whose measured attenuation fall outside the acceptable range shall be subject to further inspection and testing to determine the nature of the fault. At a minimum, an OTDR shall be used to determine the true loss for each connector pair, the exact length of the fiber and to identify the presence of any core damage.
(f) Faults related to connectorization shall be corrected, and the fiber re-tested, until acceptable attenuation measurements are recorded.
(g) Where defects are found to be inherent in the fiber itself, replace any cable having fewer than the manufacturer's guaranteed number of serviceable fibers.
(h) All fiber optic test instruments used on the site shall be capable of storing test data files and downloading these test results as data files. The fiber optic strand number shall be used as the record identifier for each test.
(i) All OTDR traces shall be delivered to the Owner's Representative in electronic format. The Contractor shall provide the Owner's Representative with software to read the OTDR traces. The application software shall be licensed to the Owner.
(j) All Power meter readings shall be provided in a file format capable of being inserted into a Microsoft Excel spreadsheet for review. Power meter readings shall be delivered to the Owner's Representative in electronic format.

4) All cables shall be tested after termination using a cable certification tester that contains the test equipment manufacturer's most current version of firmware.
5) Upon completion of testing, all connectors shall be capped with a product made for that specific function by the connecting hardware manufacturer to prevent the contamination of the fiber from construction debris or other foreign objects.
6) Test Results:
(a) The test results information for each link shall be recorded in the memory of the field tester upon completion of the test. The tester shall be capable of storing test data in either internal or external memory. The external media used shall be left to the discretion of the user.
(b) Test results saved by the tester shall be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.
(c) The test results information for each link shall be recorded in the memory of the field tester upon completion of the test. The tester shall be capable of storing test data in either internal or external memory. The external media used shall be left to the discretion of the user.
(d) Test results saved by the tester shall be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.

(e) Optional formats of data reporting are: comma separated variable (.csv), Portable Document File (.pdf) or compatible, plain text (.txt), or hypertext markup language (.html/.htm).
(f) Test results shall include the following:
(1) Telecommunications Room number
(2) Location of fiber pull i.e. (Equipment Room # to Telecom Room #)
(3) Patch panel # and location
(4) Connector type
(5) Distance
(6) Wavelength tested
(7) Technician who performed the testing

7) The Owner and Architect reserve the right to observe testing and/or randomly sample completed links for conformance to project specifications.

3.06 COPPER CABLE TESTING AND DOCUMENTATION

A. Cabling systems shall meet or exceed the electrical and transmission characteristics of the systems specified.

B. Cable segments and links shall be tested from both ends of the cable for each of the construction phases. (Verify that cable labeling matches at both ends).

C. The system shall not be considered certified until the tester has acknowledged that the performance of the physical layer of the system has been fully tested and is operational at the completion of the installation phase.

D. After the installation is complete, in addition to any other required testing as described herein, and at such times as the Owner or Architect directs, the Contractor shall be present while the Owner conducts an operating test for approval. The installation shall be demonstrated to be in accordance with the requirements of this specification. Any defects revealed shall be corrected promptly at the Contractor's expense and the tests performed again.

E. After review of the completed test results, the Owner reserves the right to retest the installed cables, utilizing the Contractor's tester and the Contractor's labor.

F. Equipment Manufacturer’s Factory Test
1. Each cable and equipment manufacturer shall factory test their respective products being installed on this project and provide test reports at time of delivery. Provide separate respective test reports indicating that they meet or exceed the latest applicable TIA/EIA Standards and technical bulletins.
2. All other products relative to this specification shall be tested to its respective industry strictest standards.
3. Each manufacturer shall factory test their respective cable or equipment provided to this project at several lower frequency levels, including the minimum and maximum frequency level indicated herein. The test reports shall indicate test results for at least five equal incremental frequency levels including the maximum required.
a. Field Testing Equipment: Submit during shop drawing review on the testing equipment to be utilized on this project. Tester shall be a Level IV device or better and configured to the specific cable installed. The installer shall test all cables installed under this Section.
1) Unshielded Twisted Pair Testing Equipment:
(a) The cable tester shall have a wide variety of preprogrammed cable types as an integral part of its testing system and have the ability to test cables less than 6 feet (6ft.) from the test point.

(1) Testing shall be accomplished using level III or higher field tester that is loaded with the most current version of test software by the manufacturer of the test equipment.
(2) Provide factory calibration report of field test equipment.

2) Testing Procedures:
   (a) Testing shall conform to TIA-568 standards.
   (b) Testing shall be to the Permanent Link Test Parameters.
   (c) Test each pair and shield of each cable for opens, shorts, grounds, and pair reversal. Correct grounded and reversed pairs. Examine open and shorted pairs to determine if problem is caused by improper termination. If termination is proper, tag bad pairs at both ends and note on termination sheets.
   (d) Test each UTP cable and passive components. Provide certification that entire installation of UTP cabling, equipment and jacks are NRTL certified meeting or exceeding a minimum of category performance specified on all four pairs of conductors.
   (e) Tests shall be based on each pair of conductors and not the aggregate multiple pair results.
   (f) Test all installed cable segments end-to-end, from the telecommunications room horizontal patch panel/cross connect block panel to each work area outlet and from each telecommunications room backbone patch panel/cross-connect block panel to respective main cross connect, and from the work area outlet to the main cross-connect (through patch cables or cross- connect wiring) with a Signal Injector, Graphical Link Testing Meter and Time Domain Reflectometer (TDR) for compliance to latest TIA performance requirements, as well as NEXT, ELFEXT, structural return loss, alternating power sum, opens, shorts, continuity, cable length, and characteristic impedance.
   (g) Provide report indicating failures and what actions were taken to ensure a passing horizontal cable and its terminations. Any cable failing the certification test (Fail, Fail* or, Pass*) must have remedial work done to provide a full pass test result; Remediation may include re-termination or replacement of the cable, which fails. Cables passing within tolerance only (Conditional Pass*) will not be accepted.

3) Test results:
   (a) The test results information for each link shall be recorded in the memory of the field tester upon completion of the test. The tester shall be capable of storing test data in either internal or external memory. The external media used shall be left to the discretion of the user.
   (b) Test results saved by the tester shall be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.
   (c) Optional formats of data reporting are: comma separated variable (.csv), Portable Document File (.pdf) or compatible, plain text (.txt), or hypertext markup language (.html/.htm).
   (d) Test Results shall include the following:
      (1) Applicable room number of jack location (room number per Contract Documents)
      (2) Applicable Telecommunications Room number
      (3) Circuit I.D. number with corresponding jack identifier
      (4) Wire Map - shall include the following:
      (5) Continuity to the remote end
      (6) Shorts between any two or more conductors
      (7) Crossed pairs
      (8) Reversed pairs
      (9) Split pairs

(10) Any other mis-wiring
(11) Length
(12) Insertion Loss
(13) Near-end Crosstalk (NEXT) Loss
(14) PS-NEXT (Power Sum Near End Cross Talk)
(15) ELFEXT (Equal Level Far End Cross Talk)
(16) PS-ELFEXT (Power Sum Equal Level Far End Cross Talk)
(17) Propagation Delay
(18) Delay Skew
(19) Return loss

3.07 TRAINING AND PATCHING

A. The Contractor shall provide a minimum of (1) person for a minimum of (8) man-hours beginning with the first scheduled move-in date to train Owner personnel in maintenance and repair of cabling system. This technician shall also assist the Owner in patching telecom services throughout the facility during the move-in period. It is at this time that all Owner-provided connectivity for voice and data services will be provided to the Contractor. Patching of the station assignments between the Owner's services demark shall also be considered part of this Contractor's work.

3.08 ACCEPTANCE

A. Prior to acceptance all the following conditions must be met:
1. As required the Contractor shall make submittals and deficiencies or rejected submittals shall be corrected.
2. All specified cable management devices including cable ladder, steel wire cable tray, 2-sided vertical rack cabling sections, horizontal ring panels, and fiber optic troughs shall be installed as indicated and specified. All parts not installed shall be inventoried and provided to the Owner in the manufacturer's packaging.
3. All seismic bracing shall be in place.
4. All specified station cabling with associated termination components, labeling and fire stopping shall be installed properly. Any component not installed shall be inventoried and provided to the Owner in the manufacturer's packaging; loose miscellaneous parts shall not be accepted.
5. Terminal blocks shall be clean and free of trimmed or cut-off copper pairs, sheaths, armors, cable lubricants or any other disposables used in the installation of the station cables.
6. All station cables shall be neatly dressed behind the terminal blocks in the IDF.
7. The backbone fiber optic cable system including all strands, connectors, termination shelves, fiber optic distribution panels, and fiber optic storage shelves has been installed and tested per these Specifications.
8. Do not install fiber optic cross-connects until after the backbone distribution cable test reports have been reviewed and accepted by the Owner.
9. All required submittals indicated in this Specification Section shall be made by the Contractor, and any deficiencies or rejected submittals shall be corrected.
10. All specified fiber optic backbone cabling with associated termination components, splicing, labeling and testing shall be installed and completed properly. Any component not installed shall be inventoried and provided to the Owner in the manufacturer's packaging. Loose miscellaneous parts shall not be accepted.
11. The fiber optic termination shelves and the racks and floors around the shelves, shall be clean and free of trimmed or cut-off fiber optic strands, buffering, sheath and cable lubricants and any other disposables used in the placement and termination of the fiber optic backbone cables.
12. All innerducts and fiber optic backbone cables shall be neatly dressed into the pathways, communications vaults and vault racking.
13. Any deficiencies and punch list items shall be corrected.
14. All as-built documentation shall be complete, reviewed and provided to the Owner.

B. Acceptance of the telecommunications system by the Owner shall be based on the result of testing, functionality, and the receipt of documentation and warranty. With regard to testing, Contractor shall provide two technicians, equipped with the specified test equipment, to do random test verification in the presence of, and at the direction of, an Owner designated representative. Verification testing shall not exceed 20% of the cable plant, provided cables tested are verified to be 100% compliant, per requirements previously stated. If more than 5% of cables tested during the verification process fail, Owner reserves the right to have the entire cable plant retested, at the Contractor's expense, and in the presence of an Owner-designated representative.

3.09 RECORD DRAWINGS

A. The project record drawings shall show the types, locations and counts of installed:
   1. Fiber optic cables and strands;
   2. Fiber optic terminations counts and types.

B. The project record drawings shall show the types, locations, cable numbers and pair counts of installed twisted-pair cable:
   1. Cable routing and numbers.

C. The project record drawings shall show the types and locations of installed equipment racks.

END OF SECTION

SECTION 28 3100
FIRE ALARM SYSTEM WITH VOICE EVACUATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This project shall include the furnishing, installation, connection, programming, commissioning, and testing of new fire alarm equipment required to form a complete coordinated system ready for operation at the project. Equipment shall be networked if indicated on the drawings. The fire alarm system shall include, but not be limited to, alarm initiating devices, alarm notification appliances, voice evacuation system, control panel (with multiple panels at different buildings networked together where indicated on the drawings, auxiliary control devices, annunciators at each building, power supply extender panels (as required), amplifiers, and all associated wiring (fiber optic network and copper system cabling).

B. Alarms/troubles at each building shall activate the local notification devices (or report troubles) at the respective building panel only and report the alarms/troubles to the main fire alarm control panel, but shall not activate other building notification devices.

C. The system shall include an emergency voice evacuation alarm communication system. A digitized pre-recorded voice message shall notify occupants that a fire alarm condition has been reported. The message shall instruct the occupants with emergency instructions. All notification shall be speaker/strobes or strobe lights.

D. The work shall include all required programming to allow proper sequence and operation as required by code. Final programming shall be done based on the actual physical room names and numbers used on site, if different from the room names or numbers on the approved plans.

E. Provide CBC 2022 compliant seismic installation. See Section 26 0500 for all certification and submittal requirements.

F. All work shall comply with Sections 26 0500 and 26 2700.

1.02 SCOPE OF WORK

A. This specification outlines the requirements for a microprocessor based, addressable (intelligent) automatic fire detection and alarm system. The system and components shall be supplied by one manufacturer of established reputation and experience who shall have produced similar apparatus for a period of at least five (5) years and who shall be able to refer to similar installations in public buildings rendering satisfactory service.

B. The work described in this specification consists of all labor, materials, equipment and services necessary and required to complete and program and test the automatic fire detection and alarm system. Any material not specifically mentioned in this specification or not shown on drawings but required for proper performance and operation shall be furnished, installed, and connected complete.

C. Where a networked system is indicated on the drawings, the work shall include all required programming to allow network operation between each control panel, for central monitoring from the Main FACP.

D. Final system programming (or re-programming for existing systems) shall be done based on the actual physical room names and numbers used on site, if different from the room names or numbers on the approved plans.

E. For existing fire alarm systems, prior to setting of the detector address on the actual device, contractor to download the list of the existing initiation devices from the fire alarm control panel(s), and verify that the address shown on plans are spares and available.

F. The contractor shall contact the local fire department and/or emergency communications authority to obtain local testing and acceptance criteria for emergency radio responder criteria.
   1. Contractor is to provide testing of the facility to ensure the entire structure meets approved radio coverage for emergency responders within the building. Coverage shall be in accordance with California Fire Code (CFC) section 510. Testing shall be coordinated with, and witnessed by, the local Fire Department, and shall be performed by a certified qualified technician as defined in section 510.5.2 of the California Fire Code. Testing shall be performed at a time when the building structure, including ceilings and walls, is judged adequately complete by the Fire Department.
   2. The building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements in 95% of all areas on each floor of the building meet signal strength requirements in sections 510 4.1.1 and 510 4.1.2 of the California Fire Code. Areas designated as vital, as determined by the Fire Department, shall have 99% coverage at signal strength required. Signal strength shall be measured on frequencies defined in section 510.4.2.2 of the CFC and as required by the Fire Department. Minimum signal strength of -95 dBm shall be receivable within the building and received by the agency's radio system outside the building, when transmitted from within the building.
   3. For passing tests, document the results of the test and submit with project close-out documentation.
   4. If the building/structure cannot support the required radio coverage, the Owner and the Architect shall be immediately notified, and a plan of action shall be put in place by the Owner and the design / construction team, for implementation of an augmented amplification system as required by section 510.4.2 of the California Fire Code.

1.03 REQUIREMENTS

A. This installation shall be made in accordance with the drawings, specification and the following:
   1. National Electrical Code Article 760
   2. NFPA Standard 72
   3. Local Codes and Authorities Having Jurisdiction
   4. ADA requirements and regulations.

B. Fire Watch:
   1. Provide an AHJ approved Fire Watch plan and Fire Watch for any portion of the fire alarm system that is left inoperative in a normally occupied building.
   2. At no time during the project shall a normally occupied building, or portion thereof that remains occupied, be left without a functioning fire alarm system, unless an approved Fire Watch is provided.
   3. Include all required planning and labor for a Fire Watch, where required.

1.04 RELATED WORK

A. Division 26: Basic materials and methods

B. Division 21: Fire protection systems

C. Division 23: HVAC systems

D. Division 23: Fire Smoke Dampers

1.05 FIRE ALARM SYSTEM DESCRIPTION

A. The system shall be a supervised, non-coded, 24 volt DC, power limited system, networked if indicated on the drawings, and shall be capable of having all addressable initiation devices on the system in alarm at one time. Notification device circuits shall be wired Class B. Initiation device circuits shall also be wired Class B. A single ground or open on any initiating device circuit or notification appliance circuit shall not cause system malfunction, loss of operating power, or the ability to report an alarm.

B. Provide initiation, notification and other devices as per specifications and indicated on drawings.

C. Indicate alarms, supervisory, and trouble signals on the main fire alarm control panel and annunciator at each building and at the building fire alarm control panel in a networked system.

D. Initiate signals to control (shut-off) HVAC system units and FSD's as per drawings and as required by code.

E. Transmit alarm signals to off-site reporting agency via a digital communicator at each fire alarm control panel, with specific building address ID.

F. The fire alarm system shall function as follows when any smoke or duct detector, waterflow switch, manual station or other initiating device operates:
   1. Operate required audible/visual and visual devices indicated on the drawings.
   2. Automatically notify off-site reporting agency.
   3. Indicate at the control panel alphanumeric display the number and location of the alarmed device.
   4. Light an indicating lamp on the smoke detector initiating the alarm.
   5. Light an indicating lamp on the remote annunciator indicating the location alarmed as well as the type of device alarmed (area smoke detector, duct detector, manual pull station, waterflow switch, kitchen fire suppression system panel, valve supervisory switch, etc.).

G. Provide additional system features and capacities as indicated in Part 2 of this Section of the Specifications.

1.06 GUARANTEE

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance.

1.07 SUBMITTALS

A. Submit fire alarm product data sheets in accordance with Division 1 and Section 26 05 00.

B. Submit manufacturer's installation instructions including back-box requirements for each piece of equipment.

C. Submit manufacturer's operating instructions and maintenance data.

1.08 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification.

A. National Fire Protection Association (NFPA) - USA:

No. 70 National Electrical Code (NEC)

No. 72 National Fire Alarm Code

B. Underwriters Laboratories Inc. (UL) - USA:

No. 268 Smoke Detectors for Fire Protective Signaling Systems

No. 864 Control Units for Fire Protective Signaling Systems

No. 268A Smoke Detectors for Duct Applications

No. 521 Heat Detectors for Fire Protective Signaling Systems

No. 464 Audible Signaling Appliances

No. 1971 Visual Signaling Appliances

No. 38 Manually Actuated Signaling Boxes

No. 346 Waterflow Indicators for Fire Protective Signaling Systems

C. Local and State Building Codes.

D. All requirements of the Authority Having Jurisdiction (AHJ).

1.09 APPROVALS

A. Fire alarm control panels and all peripherals shall have proper listing and/or approval from Underwriters Laboratory (UL) and be California State Fire Marshall listed and approved.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIAL, GENERAL

A. All equipment and components shall be new, and the manufacturer's current model.

B. The system shall be UL 864 (latest edition) listed.

C. Acceptable System Manufacturers:
1. New systems; Notifier, campus existing system.

D. All equipment and components shall be installed in strict compliance with manufacturers' recommendations.

E. All Equipment shall be attached to and ceiling/floor assemblies and shall be held firmly in place. (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.02 CONDUIT, BOXES, AND WIRE

A. All conduit and wire shall comply with section 26 27 00 of these specifications.

B. Conduit:
   1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
   2. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
   3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
   4. Conduit shall be 3/4 inch minimum.

C. Wire:
   1. All fire alarm system wiring shall be new and installed in conduit. All wiring shall be in conformance with fire alarm system manufacturer's requirements.
   2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760). Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 16 AWG for initiating device circuits and signaling line circuits, and 12 AWG for Notification device circuits.
   3. All field wiring shall be completely supervised, Class B for initiation loops, and Class B also for notification loops with end-of-line devices located as shown on the riser diagram.
   4. If indicated on the drawings, Class A loops shall be used for initiation circuits, and shall always include a return cable to the fire alarm panel terminals, per Class A and manufacturer's wiring requirements.
   5. All cable used in conduit outdoors or underground shall be Outside Plant Rated.
   6. Network communications loop shall be a 50/125 multi-mode fiber optic outside plant cable installed in inner-duct in the fire alarm site conduit and shall link all control panels if networked system is indicated on the drawings.

D. Terminal Boxes, Junction Boxes and Cabinets:
   1. All boxes and cabinets shall be UL listed for their use and purpose.
   2. Outlet boxes for surface mounting shall be fire alarm listed use boxes with exactly the same size of the device. Standard galvanized outlet or j-boxes are not acceptable.

E. Each Fire Alarm Control Panel and expander panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the power panel as FIRE ALARM and include a breaker handle lock for the dedicated breaker. Fire alarm control panel primary power wiring shall be #12 AWG. The control panel cabinet shall be properly grounded.

2.03 CONTROL PANEL - EXISTING FACP'S TO REMAIN

A. The control panel shall be microprocessor based and totally power limited. The panel shall be capable of supporting Class A (Style 6) or Class B (Style 4) Network Communications lines, and Class A (Style Z) or Class B (Style Y) Notification Circuits. The panel shall have the following features; Totally Field Programmable, Password Access Protection, Built in Panel Diagnostics, Alarm and Trouble Resound, Alarm Event Buffer, Trouble Status Buffer, Point Identification Display, 24 hour Trouble resound, One Man Walk Test, Alarm Verification, and Positive Alarm Sequence. The panel (and expander panels where required) shall include audio amplifiers and related components to support the voice evacuation requirements. The panel shall have the following relays with a form C configuration; Alarm, Trouble, Supervisory, and Default Alarm Mode (to allow alarm reporting during microprocessor failure).

B. The control panel shall be designed to monitor and process a minimum of 159 addressable inputs (smoke detectors, manual stations water flow devices, etc.), and up to 159 addressable monitor or control modules. The Network Communication Lines shall support various annunciation devices (i.e. LED Annunciators, Alphanumeric Displays, Printers) in addition to the addressable inputs and outputs described above. The system architecture shall allow for T-tapping of the Network Communications

Lines. The use of a Zone Monitor module on the Communications Line shall further enhance the system with a master/slave concept, allowing a group of conventional detection devices (standard smoke detectors manual stations, waterflow and tamper switches) to be interfaced into the system as an address point. The system shall include individual power supply expander panels as required to support the notification loops. Each notification circuit shall be independently field programmable by the use of addressable control modules rated for the required current.

C. The control panel shall contain an Alphanumeric Display interface which contains a microprocessor with a non-volatile memory to store field programmable alarm and trouble messages. The Alphanumeric Display shall consist of two 40 character lines for alarm, supervisory and trouble identification, and in quiescent mode, indicates system status.

D. The control panel shall have history reporting, with the history stored in either the alphanumeric or printer modules. The history shall be at least 1,000 events. These events can be alarm, verification, supervisory, trouble, acknowledge, system reset, walk test, and the use of any panel keypad keys and access to any panel modes such as Program or Test.

E. The control panel shall have self-diagnosis. Once the program is stored in memory and upon system initiating, if there is a discrepancy between the number of devices entered into the program and the actual number of devices connected to the system, the panel shall annunciate a trouble for the devices in question.

F. Power Supply
   1. The Power Supply for the Fire Alarm Control Panel may be integral or external to the Fire Alarm Control Panel, and shall provide all control panel and peripheral device power needs. Additional power required to operate all alarm devices (above and beyond the capacity of the main panel supply) shall be provided with power expander panel(s), connected to the alarm output of the main control panel. Provide all required interface modules and relays for proper notification circuit operation as per manufacturer's instructions. Expander panel shall be as manufactured by the chosen Fire Alarm System manufacturer (qty. as required for full alarm operation).
   2. Input power shall be provided at 120 VAC, 60 HZ. The power supply shall provide an integral battery charger for use with a minimum of 12 AH batteries.
   3. It shall provide a minimum of 6.0 amperes of regulated 24 VDC power for Audio-Visual alarm notification devices, 200 mA of smoke detector power, and 200 mA of Non-Resettable power.
   4. The power supply shall be designed to meet UL and NFPA requirements for power-limited operation on all initiating and notification circuits.
   5. Positive-temperature-coefficient thermistors, circuit breakers, fuses, or other over-current protection shall be provided on all power outputs.

G. Mechanical Design: The control panel shall be housed in a cabinet designed for mounting directly to a wall or vertical surface. The back box and door shall be constructed of .060 steel with provisions for electrical conduit connections into the sides and top. No conduit penetrations shall be utilized on the back or bottom of the panel. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. The cabinet shall be approximately 5 inches deep and 14.5 inches wide. Height shall be approximately 16 inches.

H. The control panel shall have the exact model number and manufacturer's name indicated on the front panel cover.

2.04 INITIATION DEVICES

A. Addressable photoelectric smoke detectors, (intelligent), shall be provided as indicated on the drawings, with features and characteristics as follows:
   1. The detector shall be self-compensating for ambient temperature and humidity.

2. The detector shall be addressed, tested and programmed prior to installation using a UL listed programmer/tester. The detector readout shall yield a discrete electrical value for status tracking and logging for determining maintenance and cleaning requirements.
3. The detector shall be suitable for two wire operation and two way communication on the intelligent analog signaling circuits.
4. The detector shall display a flashing red LED when in the alarm state when the system is operating from normal or standby power.
5. The detectors furnished shall be listed for use in environments as covered by Factory Mutual, UL and shall be installed according to the requirements of NFPA 72 for open area coverage.
6. Detectors for magnetic door hold open functions shall be provided with an auxiliary relay base for auxiliary function wiring connections.
    a. Door holder power shall be routed via the relay base on smoke detectors denoted with an "R" to release the associated doors upon alarm.

B. Heat detectors shall be provided as indicated on drawings. Heat detector shall be of the rate compensation type, 135 degree.

C. Duct Detectors:
1. Duct detectors for air-handling units, complete with all required sampling tubes and housings, shall be provided and connected complete by this contractor, installed by Division 23. Coordinate with Division 23.
2. Duct Detectors shall be connected to the air handler starter unit, in order to facilitate unit shut-down upon alarm (via an auxiliary relay in the duct detector). Coordinate exact control wiring with Division 23. Provide and install all required wiring and conduit for starter/duct detector interface.
3. Provide and install power connection to each duct detector as required. Coordinate with Division 23.
4. Provide Nema 3R exterior rated housings for all exterior duct detectors.

D. Manual stations, (intelligent), shall be single action and semi-flush or surface mounted as indicated on the drawings.
1. The manual station shall be equipped with a terminal strip and pressure style screw terminals for the connection of field wiring.
2. The manual stations shall be addressable and identifiable by the fire alarm control panel when they are resident on the analog loop. Address programming shall be accomplished electronically and reside within the station in non-volatile memory.

E. A monitor module interface device shall be provided for required interface points such as water flow devices and tamper switches, or any contact type devices as indicated on drawings. This interface device shall have one or two Class B (Style 4) circuits as required.

F. Provide a 120VAC circuit connection to each sprinkler system water flow bell (provided by Division 21). Wire power via the local water flow switch auxiliary contact to ring the bell upon water flow activation. Coordinate with fire protection division prior to rough-ins.

2.05 REMOTE ANNUNCIATOR

A. A remote annunciator shall be provided as indicated on the drawings. The annunciator shall be wall mounted in a multi-gang box or as required. It shall provide a 80 character display to indicate the zone(s) in alarm and LED’s for system trouble and supervisory conditions.

B. The annunciator shall include a lockable and latched door with glass front to allow viewing of all indicators.

C. The annunciator shall include a local sounder with reset and alarm acknowledge, including key lock-out.

2.06 BATTERIES

A. Batteries shall be 12 volt, sealed type, with combined Amp-Hour ratings as required by Code.

B. Battery shall have a minimum sufficient capacity to power the fire alarm system for not less than twenty-four hours in standby mode, plus 15 minutes of full system alarm upon a normal AC power failure.

C. The batteries are to be completely maintenance free, no liquids required. Fluid level checks, refilling, spills and leakage control shall not be required.

2.07 CONTROL DEVICES

A. Control modules shall be provided as indicated on the drawings for fire alarm output functions. These devices shall be connected to the Network Communications Lines, and be field programmable for one of the following options; Remote Relay (form C 1amp 24vdc, 200ma 120vac) with supervised relay operation; Remote Supervised Indicating Appliance Circuit (fused at 1 amp). There shall be an LED on the device that shall flash to indicate the unit is being monitored and a steady LED to indicate the unit has been activated. Secondary relays with control power connections shall be provided as required where contact ratings (voltage & amps) so dictate.

2.08 NOTIFICATION DEVICES

A. Speaker / Strobe Notification Devices:
   1. All speakers shall operate on 70.7 VRMS, with field selectable output taps from 1/8 to 2 Watts in 3dB steps. Frequency response shall be a minimum of 400 HZ to 4 KHZ.
      a. Speaker circuits shall have 20% space capacity for future expansion or increased power output requirements. All speaker tap settings shall be set per recommended settings (minimum 1/4 watt) for area coverage, and shall be re-tapped as required after final testing to provide adequate audible coverage throughout each area (to meet NFPA requirements).
      b. Speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.
      c. Provide amplifier modules as required to carry the full designed load, plus 20% spare capacity. Provide (1) additional back-up amplifier module for automatic back up of any failed amplifier module.
      d. Speaker/Strobe combinations shall be provided as indicated on Drawings. The speaker / strobe combination shall be Wheelock or equal, ADA and UL 1971 compliant (candela values as required) - white finish.

B. Strobe Lights shall be provided as indicated on drawings. The strobe lights shall be either ceiling mounted, or wall mounted at +80" AFF or 6" below the ceiling level, whichever is lower, Wheelock or equal, ADA and UL 1971 compliant (candela values as required) - White finish. See drawings for locations.

C. All devices in the gymnasium, multipurpose and locker rooms shall be provided with clear protective covers for vandalism protection. Provide protective covers as recommended by the manufacturer.

D. Refer to Part 3 below for required synchronization of strobes when located in the same field of view.

2.09 FIRE / SMOKE DAMPER

A. Fire / Smoke dampers (FSD's) are provided and installed by Division 23. This contractor shall provide and install a 120V power connection to each damper, wired to keep the damper in the open position under normal conditions.

B. An integral duct smoke detector shall be provided by Division 23. This contractor shall provide and install an addressable monitor module, connected to the alarm contacts on the duct detector, to monitor the condition of the detector and annunciate an alarm condition to the main control panel upon detection of smoke.

C. This contractor shall wire the 120V control power for the FSD's via an auxiliary alarm contact in the detector base, to automatically close the damper upon smoke detection. Coordinate all provisions with Division 23.

D. All FSD provisions shall comply with the applicable sections and requirements of the CEC, CFC, CBC and the local AHJ.

E. Every effort has been made to indicate all required damper locations at rated partitions in coordination with Division 23 work. This contractor shall coordinate with the sub-mechanical contractor to identify all required locations for FSD's and provide connections to all units as required by Code. The architectural drawings indicate by symbol, all such rated partitions. No extra cost shall be approved for additional required connections not shown on the drawings.

2.10 AUDIO AMPLIFIERS

A. The Audio Amplifiers shall provide audio power at 70.7 Volts RMS for distribution to speaker circuits.

B. Multiple audio amplifiers shall be mounted in the FACP, or at the FACP or expander panel locations, either to supply incremental audio power, or to function as an automatically switched backup amplifier(s).

C. The audio amplifiers shall include an integral power supply, and shall provide the following controls and indicators:
   1. Normal Audio Level LED
   2. Incorrect Audio Level LED
   3. Brownout LED
   4. Battery Trouble LED
   5. Amplifier Trouble LED

2.11 AUDIO AMPLIFIER GAIN ADJUST

A. Adjustment of the correct audio level for the amplifier shall not require any special tools or test equipment.

B. Amplifiers shall include audio input and amplified output supervision; back up input, and automatic switch over function, (if primary amplifier should fail).

C. Amplifiers shall be backed up in groups (1 amplifier backs up several at the same location). Failure of any one amplifier in the system shall not degrade system performance in any way

2.12 AUDIO MESSAGE GENERATOR (PRERECORDED VOICE)

A. Each initiating zone or intelligent device shall interface with an emergency voice communication system capable of transmitting a prerecorded voice message to all speakers in the building.

B. Activation of any alarm-initiating device shall cause a prerecorded message to sound over the designated speakers. The message shall be repeated a minimum of four (4) times.

C. A built in microphone shall be provided to allow paging through speaker zone circuits.

D. The audio message generator shall have the following controls and indicators to allow for proper operator understanding and control:
   1. All Call LED
   2. On Line LED

E. All Call Switch Local Speaker Volume Control Local (Test) Speaker

2.13 SPEAKER CIRCUIT CONTROL SWITCHES / INDICATORS

A. The speaker circuit control switches/indicators shall include visual indication of active and trouble status for each speaker circuit in the system.

B. The speaker circuit control panel shall include switches to manually activate or deactivate each speaker circuit in the system.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation, programming and testing shall be performed by current factory-authorized contractor of the specified system.

B. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

C. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

D. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

E. Provide identification labeling on all initiation and notification devices to identify loop and device number/address. Labeling shall consist of min. 3/8" black lettering on white background P-Touch style adhesive labels with machine printing, Helvetica font or similar.

F. At the final inspection a factory trained representative of the manufacturer of the major equipment shall perform the tests in Section 3.3 TESTING.

G. Wiring:
   1. See Part 1 of this Section of the Specification and the drawings for wiring requirements.
   2. When (3) or more visual notification devices are located within the same field of view and are less than 55 feet apart (within the field of view), all devices within that field of view shall be synchronized to provide the same flash rate and frequency. Provide all required sync modules and compatible strobe devices to provide a synchronized output.

3.02 PROGRAMMING

A. Provide system programming as required by code to provide a fully functional system. Final programming shall be done based on the actual physical room names and numbers on site, if different from the room names or numbers on the approved plans.

B. Include changes to existing system programming (if existing), to accommodate the new devices and equipment, as well as any sequence of operation changes.

C. When the device address(es) shown on plan is already programmed to an existing device, use another available address and show any changes or revisions on the as-built drawings during the project closeout.

3.03 TESTING

A. Refer to Scope of Work in Part 1 of this section for required emergency radio responder system testing requirements and documentation.

B. Provide the service of a competent, factory trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. Each building shall be separately tested as completed and where a networked system is indicated on the drawings, the entire networked system tested just prior to project completion. Include contractor pre-test for each building prior to the final AHJ testing to insure a suitable final test result.
   1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
   2. Close each sprinkler system flow valve and verify proper supervisory alarm at the respective FACP and/or annunciator.
   3. Verify activation of all flow switches.
   4. Open initiating device circuits and verify that the trouble signal actuates at the respective FACP and/or annunciator.
   5. Open and short all notification appliance circuits and verify that trouble signals actuate at the respective FACP and/or annunciator.
   6. Ground circuits and verify response of trouble signals at the respective FACP and/or annunciator.
   7. Check presence and audibility of tone at all alarm notification devices.
   8. Check installation, supervision, and operation.
   9. Verify that each initiating device alarm is properly received and processed by the respective FACP and annunciator (Walk Test).
   10. Conduct tests from each FACP to verify trouble indications for common mode failures, such as alternating current power failure.

C. Test reports shall include, but not be limited to:
   1. A complete list of equipment installed indicating proper operations as listed above.
   2. Point print of all devices connected to all the FACP's.

3.04 FINAL INSPECTION

A. Final acceptance will require the contractor to deliver to the Owner the following;
   1. A single bookmarked PDF file of the operating instructions and system maintenance manuals.
   2. A single bookmarked PDF file of record drawings.
   3. A single bookmarked PDF file of the final test reports.
   4. A single bookmarked PDF file indicating the name and phone number of person to contact in the event of equipment failure, and date when system warranty will be terminate.
   5. A single bookmarked PDF file of data sheets for each piece of equipment supplied.

B. The fire alarm system notification audibility and intelligibility shall be tested and approved prior to final acceptance. Verify that all occupied spaces in the buildings are provided with adequate audibility and intelligibility of the temporal 3 alarm tone and voice evacuation recorded message. Test to be conducted in the presence of the IOR, who will provide acceptance of test outcome. Provide, install, and test additional alarm devices as required, if any deficiencies are noted.

3.05 GUARANTEE

A. See Part 1 of this Section of the Specifications.

3.06 INSTRUCTION

A. Provide complete instruction manuals and training to the building personnel. "Hands-on" demonstrations of the operation of all system components and the entire system shall be provided.

END OF SECTION