DEPARTMENT OF PUBLIC HEALTH
BASEMENT RENOVATION

1221 Fulton Street
Fresno, CA 93721

Contract # 24-S-14

The County of Fresno
Department of Public Works and Planning

2220 Tulare St., 8th Floor
Fresno, California 93721

PROJECT MANUAL

Pre-bid Conference:	Wednesday, March 12, 2025, 10:00 A.M.
Bid Date:	**Thursday, April 3, 2025** **2:00 P.M. (1400 hours and 00 seconds)**

Budget / Account – 5620 / 1500 / 08150 / 91760

Development Services & Capital Projects Division

Department of Public Works and Planning

ADDENDUM 01

Contract # 24-S-14

Dated: 3-24-2025

The foregoing documents are amended in the respects as herein set forth. This addendum and the amendments herein shall become part of said documents and of any contract entered into pursuant to said documents.

PLEASE ACKNOWLEDGE THIS ADDENDUM ON YOUR PROPOSAL. IF YOU HAVE GIVEN THE CONTRACT DOCUMENTS TO SOMEONE ELSE, PLEASE FORWARD THIS ADDENDUM.

3-24-2025
Date Signed



Architect of Record: _____
Matthew B. Lopez, Lic.# C-26483

FRESNO COUNTY
Department of Public Works and Planning
Development Services and Capital Projects Division
m/a 2220 Tulare Street, Eighth Floor
Fresno, CA 93721 (559) 600-4536
mattlopez@fresnocountyca.gov

A. BID FORMS: Bid Express Solicitation

No changes

B. BID FORMS: Paper

No changes

C. SPECIFICATIONS / PROCUREMENT CONTRACTING REQUIREMENTS – DIVISION 00

a. **Section 00 01 10 – Table of Contents**
No changes
b. **Section 00 11 13 – Notice to Bidders**
No changes
c. **Section 00 52 13 – Agreement**
No changes
d. **Section 00 72 00 – General Conditions**
No changes

D. SPECIFICATIONS / SPECIAL PROVISIONS – DIVISION 01

No changes

E. DRAWINGS

a. **Roof Plan & Details - Sheet A4.41**

i. **DELETE:**
ALL ROOF MEMBRANE REPAIRS SHALL BE DONE BY FRESNO ROOFING OR AN ARCHITECT & CLIENT APPROVED ALTERNATE.

REPLACE with:
ALL ROOF MEMBRANE REPAIRS SHALL BE DONE BY A CONTRACTOR APPROVED BY THE ARCHITECT OF RECORD.

ii. **DELETE:**
PRIOR TO THE START OF ANY ROOFING ACTIVITY, THE CONTRACTOR SHALL MEET WITH MALARKEY ROOFING COMPANY REPRESENTATIVE AND SHALL MAKE REPAIRS SUCH THAT ALL EXISTING WARRANTIES SHALL BE MAINTAINED AS ORIGINALLY SPECIFIED.

REPLACE with:
PRIOR TO THE START OF ANY ROOFING ACTIVITY, THE APPROVED CONTRACTOR SHALL REVIEW THE EXISTING WARRANTIES AND MAKE REPAIRS SUCH THAT ALL EXISTING WARRANTIES SHALL BE MAINTAINED AS ORIGINALLY SPECIFIED.

F. GENERAL CLARIFICATIONS:

No changes

G. REQUEST FOR CLARIFICATION RESPONSES:

a. **Question #S14-2:** On Page A4.41 General Notes state the following: "All roof membrane repairs shall be done by Fresno Roofing or an architect & client approved alternate." Nations Roof just finished this project, we should be the company called out and approved for repairs.
Response: Clarified above.

END OF SECTION

ADDENDUM 02

Contract # 24-S-14

Dated: 03/28/2025

The foregoing documents are amended in the respects as herein set forth. This addendum and the amendments herein shall become part of said documents and of any contract entered into pursuant to said documents.

PLEASE ACKNOWLEDGE THIS ADDENDUM ON YOUR PROPOSAL. IF YOU HAVE GIVEN THE CONTRACT DOCUMENTS TO SOMEONE ELSE, PLEASE FORWARD THIS ADDENDUM.

3-28-25
Date Signed



Architect of Record: _____
Matthew B. Lopez, Lic.# C-26483

FRESNO COUNTY
Department of Public Works and Planning
Development Services and Capital Projects Division
m/a 2220 Tulare Street, Eighth Floor
Fresno, CA 93721 (559) 600-4536
mattlopez@fresnocountyca.gov

A. BID FORMS: Bid Express Solicitation

No changes

B. BID FORMS: Paper

No changes

C. SPECIFICATIONS / PROCUREMENT CONTRACTING REQUIREMENTS – DIVISION 00

a. **Section 00 01 10 – Table of Contents**
No changes
b. **Section 00 11 13 – Notice to Bidders**
No changes
c. **Section 00 52 13 – Agreement**
No changes
d. **Section 00 72 00 – General Conditions**
i. Section 2.40 INSURANCE

DELETE: Automobile Liability: Insurance Services Office (ISO) Form CA 0001 covering Code 1 (any auto), with limits no less than five million dollars ($5,000,000) per accident for bodily injury and property damage. Coverage should include owned and non-owned vehicles used in connection with this Agreement and all applicable endorsements.

REPLACE with: Automobile Liability: Automobile liability insurance with limits of not less than five million dollars ($5,000,000) per accident for bodily injury and for property damages. Coverage must include any auto used in connection with this Agreement.

D. SPECIFICATIONS / SPECIAL PROVISIONS – DIVISION 01

No changes

E. DRAWINGS

a. **DELETE:** Plan Sheet P2.03

REPLACE with: Plan Sheet P2.03 – Addendum 2

F. GENERAL CLARIFICATIONS:

No changes

G. REQUEST FOR CLARIFICATION RESPONSES:

a. **Question S14-13:** Issue: The scope of work related to the telecom and speaker system needs to be clarified. including conduit requirements and termination locations. Request: 1. Please confirm the scope of work for the telecom and speaker system, including any specific requirements for installation. 2. Clarify whether we are responsible for providing conduit only up to the accessible ceiling or if we must route it back to the source.
Response: Contractor to omit this scope of work because a County vendor will be performing the work.

b. **Question #S14-15:** In enlarged drawing labeled A/P2.03 & B/P2.03, the plans call out for WF-2 but have an arrow with detailed description saying the fixture is WF-1. Can you please clarify if it is WF-1 or if a WF-2 needs to be added to the fixture schedule?
Response: Clarified in Sheet P2.03 – Addendum 2. Plan Sheet P2.03 provided with Addendum 2 includes a new schedule for WF-2 and relabeling of WF-1 and WF-2 on Details A/P2.03 and B/P2.03.

c. **Question #S14-16:** In the enlarged drawing labeled A/P2.03, the plans show a domestic cold water line going from S-1 to SB-1 but there is no source of where the water is coming from. Can you please clarify where the point of connection is to the main line?
Response: Clarified in Sheet P2.03 – Addendum 2. Cold water supply piping added to drawing. A 3/4" cold water supply shall tee from the 1" cold water supply to water filter WF-1, and tee into the supply line between sink S-1 and supply box SB-1.

d. **Question #S14-19:** Can we remove the requirement of a symbol 1 on auto as we carry two specific auto policies? These two policies are Non-owned and Hired auto policy as well as a commercial auto policy with symbol 7 which is named vehicles.
Response: Clarified above.

END OF SECTION

SECTION 000107 - COUNTY ADOPTION AND ACKNOWLEDGEMENT & SEALS

DEPARTMENT OF PUBLIC HEALTH BASEMENT RENOVATION

Contract # 24-S-14

Brian Pacheco	1st District
Garry Bredefeld, Vice Chairman	2nd District
Luis Chavez	3rd District
Buddy Mendes, Chairman	4th District
Nathan Magsig	5th District

Paul Nerland, County Administrative Officer

Steven E. White, Director
Department of Public Works and Planning — Date Signed: 2/26/25

William M. Kettler, Deputy Director of Planning
Department of Public Works and Planning — Date Signed: 2/26/25

Date Signed: 2/20/25

LICENSED ARCHITECT
MATTHEW B. LOPEZ
C 26483
REN: 12-31-2025
STATE OF CALIFORNIA

Architect: _____
Matthew B. Lopez, Lic.# C-26483

FRESNO COUNTY
Department of Public Works and Planning
Development Services and Capital Projects Division
m/a 2220 Tulare Street, Eighth Floor
Fresno, CA 93721 (559) 600-4536
mattlopez@fresnocountyca.gov

SECTION 000108 – GENERAL

The work is done in accordance with the technical specifications, accepted 03/17/2023 titled “Specifications Fresno County Dept. of Public Health Brix-Mercer Building Basement Renovations” (2023 Technical Specifications) and the following Procurement Contracting Requirements and Special Provisions (Special Provisions). Where these provisions indicate to replace, add to, delete, delete from, or otherwise modify a “section,” or a portion thereof, the section or portion thereof to which such modification is to be applied is the section or portion thereof with the corresponding numbering in the 2023 Technical Specifications. In case of conflict between the 2023 Technical Specifications and these Special Provisions, the Special Provisions shall take precedence over and be used in lieu of such conflicting portions.

Replace DIVISION 00 – INTRODUCTORY INFORMATION
GENERAL CONDITIONS with: Division 00 – Procurement Contracting Requirements

T A B L E O F C O N T E N T S

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SECTION 03 3000 - Cast-In-Place Concrete
SECTION 03 5416 - Hydraulic Cement Underlayment

DIVISION 05 – METALS
SECTION 05 1000 - Structural Steel
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SECTION 05 7313 - Decorative Metal Railings

DIVISION 06 – WOOD AND PLASTICS
SECTION 06 4100 - Custom Cabinets
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END OF SECTION

COUNTY OF FRESNO **STATE OF CALIFORNIA**

NOTICE TO BIDDERS

Contract Name:	**DEPARTMENT OF PUBLIC HEALTH BASEMENT RENOVATION**
Project Address / Location:	**1221 FULTON STREET** **FRESNO, CA 93721**
Contract Number:	**24-S-14**
Bid Opening Date & Time:	Thursday, April 3, 2025 2:00 P.M. (1400 hours and 00 seconds)

Sealed Proposals / Bids Received at EITHER (choose ONE):
https://www.bidexpress.com/businesses/36473/home
or
Department of Public Works and Planning
Office of the Design Engineer
2220 Tulare St., 7th Floor
Fresno, CA 93721

The work to be done consists, in general, of the redesign and interior improvements of the basement of the Brix-Mercer Building that was previously damaged by flooding. Interior improvements to consist of the assembly of meeting rooms, offices, and storage occupancies including the construction of new walls, carpeting, and painting, with upgrades to the plumbing, mechanical, fire sprinklers, and electrical systems.

Pre-bid Conference:	Mandatory 10:00 A.M. on Wednesday, March 12, 2025 1221 Fulton Street Fresno, CA 93721
Planholders website	"Contractor Bidding Opportunities" http://www.fresnocountyca.gov/planholders
Requests for Clarification (RFC) Deadline & Form	http://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/Construction-Bidding-Opportunities/24-S-14-Department-of-Public-Health-Basement-Renovation/Request-for-Clarification-Form no later than 2:00 p.m. on the tenth (10th) calendar day before bid opening
Bid Submission Questions	DesignServices@fresnocountyca.gov (559) 353-4919 or (559) 600-4543

Request to be Added to Planholders Form	https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/Construction-Bidding-Opportunities/Request-to-Be-Added-to-the-Planholders-List-Form
Architect's Estimate Range	$8,400,000 - $9,200,000
Working Days (Section 005213)	All work within three hundred ten (310) working days

Required Valid California Contractor's License
Class B (General Building Contractor)

Basis of Bid: Bids are required for the entire work described herein. Bids will be compared on the basis of the total lump sum bid.

Project Details: Electronic copies, in ".pdf" file format, of the official project plans and specifications, bid books and proposal sheets, and such additional supplemental project information as may be provided, are available to view, download, and print on the Planholders website.

This project is funded by the American Rescue Plan Act (ARPA).

Bid Opening: Promptly following the closing of the bidding all timely submitted bids will be publicly opened and viewable via a livestream (the link for which will be posted at) for construction in accordance with the project specifications therefor. A bid summary of the bids received will be posted to the project's website, generally within twenty-four (24) hours of the bid opening.

The apparent lowest bidder shall submit a Cost Distribution of the bid, otherwise known as a "Schedule of Values," (refer to Section 002113 Instructions to Bidders 1.16 Post-Bid / Pre-Award Information and Requirements) within eight (8) days of the Bid Opening.

Planholders: Bidders may fill out a Request to be Added to Planholders list at the link listed above. Requesters will then be listed as a planholder for the project on the website and receive notifications and addenda issued for the project. Prospective bidders may also select the project on www.BidExpress.com. Those that demonstrate interest in the project will be added to the planholders list, and receive notifications and addenda issued for the project. Planholder and exchange/publication names may be obtained from the County of Fresno Planholders website listed above.

Requests for Clarification (RFC) & Addenda: All requests for substitutions (refer to Section 2.45, Substitution of Materials in the General Conditions) and questions regarding this project shall be in writing and shall be received by the Department of Public Works and Planning, Design Division, no later than 2:00 P.M. on the tenth (10th) calendar day prior to bid opening. All substitution requests and questions received after this deadline will not receive a response unless the Department of Public Works and Planning elects to issue an addendum to revise the bid opening date. In the event that the bid opening date is revised, the deadline for questions will be extended to no later than 2:00 P.M. on the tenth (10th) calendar day before the revised bid opening date.

Any changes to, or clarification of, the project plans and specifications shall be in the form of a written addendum issued to planholders of record. Questions that prompt a change or clarification shall be included in the addendum with the subsequent answer.

Any oral explanation or interpretations given to this project are not binding.

Bid Submission Instructions: If a bidder is unable to submit a bid via Bid Express, Bid Books, which contain bid proposal sheets necessary to submit a bid, may be obtained within the Specifications documents posted on the County of Fresno website.

Electronic bids shall be submitted via the Bid Express website.

Hardcopy bids shall be submitted in a sealed envelope addressed to the "Department of Public Works and Planning, Office of the Design Engineer" and labeled with the name of the bidder, contract number, name of the project, and the statement "Do Not Open Until The Time Of Bid Opening."

Bid Security: Bid security in the amount of ten percent (10%) of the amount of the bid, and in the form of a bid bond issued by an admitted surety insurer licensed by the California Department of Insurance, cash, cashier's check or certified check shall accompany the bid. You must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code section 20129(a)), prior to the bid opening. Bid security shall be made in favor of ***the County of Fresno.***

Hardcopy bid bonds shall be submitted in a sealed envelope addressed to "Department of Public Works and Planning, Office of the Design Engineer" and labeled with the name of the bidder, contract number, name of the project, and the statement "Do Not Open Until The Time Of Bid Opening – BID BOND."

Each bond specified in this Notice shall be issued by a surety company designated as an admitted surety insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and acceptable to the County of Fresno. Bidders are cautioned that representations made by surety companies will be verified with the California Department of Insurance. Additionally, the County of Fresno, in its discretion, when determining the sufficiency of a proposed surety company, may require the surety company to provide additional information supported by documentation. The County generally requires such information and documentation whenever the proposed surety company has either a Best's Key Rating Guide of less than **A** and a financial size designation of less than **VIII**. Provided, however, that the County expressly reserves its right to require all information and documentation to which the County is legally entitled from any proposed surety company.

Additional Information and Requirements: No contract will be awarded to a contractor who has not been licensed in accordance with the provisions of the Contractors State License Law, California Business and Professions Code, Division 3, Chapter 9, as amended, or whose bid is not on the proposal form included in the contract document.

This project is subject to the contracting requirements and implementing regulations as amended in Title 13, Section 2449 General Requirements for In-Use Off-Road Diesel-Fueled Fleets, of the California Code of Regulations (13 CCR § 2449(i)). Bidders must submit a valid Certificate of Reported Compliance (CRC) issued by the California Air Resources Control Board at the time of bidding. Bidders are responsible for submitting their listed subcontractors' CRCs and any supporting documentation within five (5) calendar days of the bid opening. Failure to submit the required CRCs may render a bid non-responsive.

Asbestos certification from the Contractors State License Board and registration with the Division of Occupational Safety and Health is not required by the prime contractor to bid on this project, however any firm performing asbestos abatement must hold the proper licenses and certifications to perform the work. [Health and Safety Code 25914.2]

Friable and Non-friable asbestos containing materials (ACM) are to be removed as a part of this project, and it is anticipated that removal of ACM will result in release of airborne asbestos fibers and lead into the atmosphere. Refer to the asbestos report under Supplemental Information on the project website for more information regarding locations and quantities of identified asbestos-containing materials as well as locations of identified lead-based paint and lead-containing paint to be impacted as part of the scope of work.

The Contractor and their subcontractors shall comply with all applicable statutes and regulations, and all provisions of Sections 2.51, 2.52 and 2.55 of the General Conditions, regarding payment of wages, hours of work and all other labor compliance issues.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at County of Fresno, Department of Public Works and Planning, 2220 Tulare Street, Sixth (6th) Floor, Fresno CA 93721-2104 and available from the California Department of Industrial Relations' Internet web site at http://www.dir.ca.gov/DLSR/PWD. Future effective general prevailing wage rates, which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

The Board of Supervisors hereby specifies that portions of the work can only be performed outside the regular working hours as defined in the applicable collective bargaining agreement filed with the Director of Industrial Relations in accordance with Labor Code section 1773.1, and that the overtime requirements for Saturdays, and holidays are hereby waived for these portions of the work, as more particularly described in the specifications. However, this exemption shall not negate the overtime provisions specified in Labor Code section 1815.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code section 12990.

The successful bidder shall furnish a faithful performance bond in the amount of one hundred percent (100%) of the contract amount and a payment bond in the amount of one hundred percent (100%) of the contract amount. Each bond specified in this Notice (bid bond, faithful performance bond and payment bond) shall meet the requirements of all applicable statutes, including but not limited to those specified in Public Contract Code section 20129 and Civil Code section 3248.

Pursuant to Public Contract Code section 22300, substitution of securities for any moneys withheld by the County of Fresno to ensure performance under the contract shall be permitted.

The Board of Supervisors reserves the right to reject any or all bids.

Board of Supervisors, County of Fresno

Paul Nerland, County Administrative Officer

Bernice E. Seidel, Clerk of the Board

Issue Date: March 4, 2025

INSTRUCTIONS TO BIDDERS

1.01 EXPLANATION TO BIDDERS

An explanation desired by bidders regarding the meaning or interpretation of the bid documents must be requested in writing no later than 10 days prior to the bid opening.

Oral explanations given before the award of the contract will not be binding. Any interpretation made will be in the form of an addendum to the bid documents, said addendum will only be issued by the County's Director of Public Works and Planning ("Director"). Any addenda or supplemental information will be published on the Fresno County website at https://www.fresnocountyca.gov/planholders and the planholders of record will be notified.

1.02 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF WORK

The bidder is required to examine carefully the proposal, plans, specifications, special provisions, and contract forms for submitting a proposal. It is mutually agreed that the submission of a proposal shall be considered prima facie evidence that the bidder has made such examination and is satisfied with the conditions to be encountered in performing the work and as to the requirements of the plans, specifications, and special provisions of the contract documents.

1.03 PROPOSAL GUARANTEE

The bidder shall furnish a proposal guarantee, consisting of a bid bond, cash, certified check, or cashier's check, for ten percent (10%) of the total amount bid, including additives.

If security is provided in the form of a certified check or cashier's check, the County may make such disposition of same as will accomplish the purpose for which submitted. Checks deposited by unsuccessful bidders will be returned as soon as practicable after the bid opening.

1.04 PREPARATION OF PROPOSALS

The bidder shall prepare a proposal on the blank proposal form furnished by the County.

The bidder's proposal shall be executed by the individual, by one or more partners of the partnership, or by one or more of the officers of the corporation submitting it. If the proposal is made by an individual, a name and post office address must be shown. If made by a partnership, the name of each member of the partnership must be shown. If made by a corporation, the proposal must show the name of the state under which the corporation was chartered and the name of the president, vice president, secretary and treasurer.

1.05 SUBCONTRACTORS

Every person submitting a bid to perform the work called for in the bid request shall set forth in this bid:

A. The name and the location of the place of business, and the California contractor's license number, and the public works contractor registration number issued pursuant to Section 1725.5 of the Labor Code, of each subcontractor who will perform work or labor or render service to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half (1/2) of one percent (1%) of the general contractor's total bid; and

B. The portion of the work which will be done by each subcontractor.

The attention of bidders is directed to the provisions of Public Contract Code Section 4100 et seq which set forth the consequences and possible penalties which may result from a failure to comply strictly with the foregoing requirements for listing of subcontractors.

1.06 SUBMISSION OF PROPOSAL

A. Electronic Bid Submittal

The bidder has the option to submit the bid for this Project electronically. The bidder must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), prior to the bid opening.

Bidders submitting online may

1. use one of the accepted electronic sureties (Tinubu Surety or Surety 2000) to submit their bid bond; or
2. attach to the online bid a scan of a notarized paper bid bond, followed by delivery of the original paper notarized bidder's bond by the admitted surety insurer so that it is received by Design Services no later than 4:00 PM on the fifth (5th) calendar day after the bid opening; or
3. submit cash, cashier's check, certified check, or a bidder bond so that it is received by Design Services prior to the bid opening.

Hardcopy bid bonds shall be

- submitted in a sealed envelope
- addressed to "Department of Public Works and Planning, Office of the Design Engineer" and
- labeled with
  - the name of the bidder,
  - contract number,
  - name of the project, and
  - the statement "Do Not Open Until The Time Of Bid Opening – BID BOND."

The address for hand delivery is listed in the Notice to Bidders for the bid opening (Seventh Floor, Fresno County Plaza Building, 2220 Tulare St., Fresno, CA 93721). The address for delivery by mail is Sixth Floor, Fresno County Plaza Building, 2220 Tulare Street, Fresno, CA 93721).

B. Bid Submittal by Personal Delivery or by Mail

The bidder has the option to submit the bid by personal delivery or by mail. The bidder shall specify, on the blank Proposal form, a lump sum price in both words and figures for each bid item, including alternates, additives and supplemental items. If the bid is not submitted electronically, then all words

and figures shall be written on the Proposal form in ink. In the case of a discrepancy between the prices written in words and those written in figures, the written words shall govern. The bidder's proposal shall be signed in ink by the individual executing the bid on behalf of the bidder.

The required Proposal Guarantee must accompany the proposal.

When sent by mail, a sealed proposal must be addressed to the Fresno County Department of Public Works and Planning, Office of the Design Engineer, Sixth Floor, Fresno County Plaza Building, 2220 Tulare Street, Fresno, CA 93721. All proposals shall be filed prior to the time and at the place specified in the NOTICE TO BIDDERS. Proposals received after the time for opening of the proposals will be returned to the bidder unopened.

1.07 IRREGULAR PROPOSALS

Proposals that do not conform to bid requirements may be rejected as nonresponsive. Proposals shall be considered irregular and may be rejected for various reasons, including but not limited to the following:

A. The proposal forms furnished by the County are not used or are altered.

B. There are unauthorized additions, conditional or alternate proposals or irregularities of any kind which tend to make the proposal incomplete or indefinite.

C. The bidder adds any provision reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.

D. The bid fails to contain a price for each bid component.

1.08 DISQUALIFICATION OF BIDDERS

Any one or more of the following may be considered to constitute sufficient cause for disqualification of a bidder and rejection of that bidder’s proposal:

A. More than one proposal for the same work from an individual, partnership or corporation.

B. Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the County until such participant shall have been reinstated as a qualified bidder.

C. Lack of competency or inadequate machinery, plant or other equipment as considered necessary to perform this project, as may be revealed by financial statement if required.

D. Unsatisfactory performance record as shown by past work for the County, judged from the standpoint of workmanship and progress.

E. Prior commitments or obligations which in the judgment of the County might hinder or prevent the prompt completion of the work.

F. Failure to pay, or satisfactorily settle, all bills due for labor or materials which remain pending under any former contract(s) at the time of submittal of the bid for this project.

G. Failure to comply with any prequalification requirements of the County.

H. Failure to furnish full amount of Proposal Guarantee with bid or failure to sign bid bond.

1.09 WITHDRAWAL OR REVISION OF PROPOSALS

A bidder may, without prejudice, withdraw a proposal after it has been deposited, provided the request for such withdrawal is received in writing before the time set for opening proposals. The request shall be executed by the bidder or the bidder's duly authorized representative and shall include the name of the individual authorized to receive the withdrawn proposal. Said individual shall be required to present photo identification prior to withdrawing the proposal. The bidder may then submit a revised proposal provided it is received prior to the time set for opening proposals.

1.10 PUBLIC OPENING OF PROPOSALS

Proposals will be opened and read publicly at the time and place indicated in the Notice to Bidders. Bidders or their authorized agents are invited to be present.

1.11 BID PROTEST PROCEDURE / RELIEF OF BIDDER

A. BID PROTEST PROCEDURE

Any bid protest must be submitted in writing and delivered by the Bidder by either of the following means: (1) via e-mail to DesignServices@fresnocountyca.gov; or (2) via certified mail, return receipt requested to the following address: Design Division, Department of Public Works and Planning, 2220 Tulare Street, Sixth Floor, Fresno, CA 93721.

The bid protest must be received no later than 5:00 p.m. of the seventh (7th) calendar day following the deadline for submittal of the specific bid document(s) placed at issue by the protest. Any Bidder filing a protest is encouraged to submit the bid protest via e-mail, because the deadline is based on the Department's receipt of the bid protest. A bid protest accordingly may be rejected as untimely if it is not received by the deadline, regardless of the date on which it was postmarked. The Bidder's compliance with the following additional procedures also is mandatory:

The initial protest document shall contain a complete statement of the grounds for the protest, including a detailed statement of the factual basis and any supporting legal authority.

The protest shall identify and address the specific portion of the document(s) forming the basis for the protest.

The protest shall include the name, address and telephone number of the person representing the protesting party.

The Department will provide a copy of the initial protest document and any attached documentation to all other Bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

The Board of Supervisors will issue a decision on the protest. If the Board of Supervisors determines that a protest is frivolous, the party originating the protest may be determined to be irresponsible and that party may be determined to be ineligible for future contract awards.

The procedure and time limits set forth herein are mandatory and are the Bidder's sole and exclusive remedy in the event of a bid protest. Failure by the Bidder to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including the subsequent filing of a Government Code Claim or legal proceedings.

B. RELIEF OF BIDDER

A bidder who claims a mistake in their bid must follow the procedures in Public Contract Code Section 5100 et seq in seeking relief of their bid.

1.12 AWARD OF CONTRACT

The award of the contract, if it is awarded, will be to the lowest responsible bidder whose proposal complies with all the prescribed requirements. The award, if made, will be within 68 days after the opening of proposals.

If the County finds that it will be unable to award the contract within 68 calendar days after the opening of proposals, the Director may request any or all bidders to extend all terms of their proposal(s) to a specified date. It is possible that additional extensions may subsequently be requested. If a bidder does not elect to extend the terms of their proposal beyond the 68 calendar days following opening of proposals, or does not respond within 10 days to any request for an extension, that bidder's proposal will be deemed as having expired 68 calendar days following opening of the proposals, and that bidder's proposal will not be considered for award of the contract.

The successful bidder will be notified in writing, by letter mailed to the address shown on their proposal, that their bid has been accepted and that they have has been awarded the contract.

The right is reserved by the County to reject any or all proposals, to waive technicalities (such as immaterial bid irregularities), to advertise for new proposals, or to proceed to do this work otherwise, if in the judgment of the awarding authorities the best interests of the County will be promoted thereby.

1.13 CANCELLATION OF AWARD

The awarding authority reserves the right to cancel the award of any contract at any time before the execution of said contract by all parties without any liability against the County.

1.14 CONTRACT BONDS

The bidder to whom the award is made shall, within ten days, enter into a written contract with the County. The bidder shall forfeit the Proposal Guarantee in case the bidder does not follow through with execution of the written contract within ten days after the contract is awarded.

The successful bidder shall furnish a faithful performance bond in the amount of 100 percent (100%) of the contract amount and a payment bond in the amount of 100 percent (100%) of the contract amount, and one-year Warranty Bond in the amount of 10 percent (10%) of the contract amount. Said bonds shall be submitted in triplicate.

The payment bond shall contain provisions such that if the Contractor or their subcontractors shall fail to pay (a) amounts due under the Unemployment Insurance Code with respect to work performed under the contract, or (b) any amounts required to be deducted, withheld and paid over to the Employment Development Department and to the Franchise Tax Board from the wages of the employees of the Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, then the surety will pay these amounts. In case suit is brought upon the payment bond, the surety will pay a reasonable attorney's fee to be fixed by the court.

The contract form is attached hereto for the Contractor's information only. Execution of the contract by the successful bidder will not be required until after the bid award is made. Liability and Workers Compensation Insurance requirements shall be as set forth in the Agreement.

1.15 BUILDERS RISK INSURANCE

The Contractor shall obtain and maintain in force Builder’s Risk Insurance against loss or damage from all perils. The policy shall cover the entire structure on which the work of this contract is to be done, up to the full insurable value thereof (except that if the contract is for remodeling, alteration, repair, or maintenance, then the policy shall cover the value of the contract therefore), including items of labor and materials connected therewith on the site, materials in place or to be used as part of the permanent construction including materials stored and partially paid for by the County as provided in Division 00-General Conditions, surplus materials, shanties, protective fences, bridges, or temporary structures, miscellaneous materials and supplies incident to the work , and such scaffolding, stagings, towers, forms and equipment as are not owned or rented by the Contractor, the cost of which is included in the cost of the work. EXCLUDED: This insurance does not cover any tools owned by mechanics, any tools, equipment, scaffolding, staging, towers, and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the work, or any structures erected for the Contractor’s administration of the project.

All subcontractors shall be insured to the extent of their portion of the work under the Contractor. The Contractor shall request, and is responsible to confirm with its insurer, that the County and all subcontractors are named, both as additional insured and as additional loss payees, on the Builder’s Risk insurance policy. The County, Contractor, and all subcontractors waive all rights, each against the others, for damages arising from perils covered by the insurance required under the terms of this article, except such rights as they may have to the proceeds of the Builder’s Risk insurance obtained and maintained by the Contractor. The Contractor shall file a certificate of such insurance with the County upon issuance of the policy, and with any subcontractors upon its request.

1.16 POST-BID / PRE-AWARD INFORMATION

Within eight (8) calendar days after bid opening, the apparent low bidder shall submit the following information to the DesignServices@fresnocountyca.gov:

a. A cost distribution of the bid, with costs shown for major items of work as defined by either the project specification index, the Uniform Construction Index (UCI), or other method as appropriate for the project and approved by the Engineer.

b. The cost distribution shall distinguish between work to be done by the bidder's own forces and work that will be subcontracted (including those who are to furnish materials or equipment fabricated to a special design); all subcontractors shall be named, regardless of the dollar amount of subcontracted work. Bidders' attention is also directed to California Public Contract Code Section 4100 et seq regarding subcontracting.

The County reserves the right to reject any proposed subcontractor, installer, or supplier who cannot show satisfactory evidence of meeting the qualifications required by the specification documents. In the event of such rejection, the apparent low bidder shall, within five working days, submit the name and qualifications of a replacement subcontractor, installer, or supplier satisfactory to the County. Such replacement submittal shall be in accordance with all specification requirements.

No adjustment of bid prices shall be made in the event of such replacement.

This information may be used in the evaluation of bids. If the project is awarded, the cost distribution will be used in determining amounts payable on progress payments and final payment.

The County may request that bidders other than the apparent low bidder submit similar cost distribution or qualification information, for the purpose of evaluating bids.

Upon completion of the bid evaluation process, cost distributions or qualification information submitted by other than the apparent low bidder will be returned upon request.

END OF SECTION

BIDDERS' CHECKLIST (BUILDING CONTRACTS)

Because of numerous technical irregularities resulting in rejected proposals for projects, the following checklist is offered for the bidders' information and use in preparing the proposal. This checklist is not to be considered as part of the contract documents. Bidders are cautioned that deleting or not submitting a form supplied in the bid documents (even if the form does not require signature) may result in an irregular bid.

PROPOSAL/BID SHEET (Section 004213)
Bidder name on each sheet. Price for each item including: each additive, deductive, supplemental or alternate items. Make no additions such as "plus tax", "plus freight", or conditions such as "less 2% if paid by 15th". Use ink or typewriter. Acknowledge addenda.

BID SECURITY FORM - Read the Notices and Notes (Section 004313)
Indicate type of bid security provided.
Provide contract license information.

State business name and if business is a:
- Corporation - list officers
- Partnership - list partners
- Joint Venture - list members
  - If Joint Venture members are corporations or partnerships, list their officers or partners.
- Individual - list Owner's name and firm name style

Signature of Bidder **– BID MUST BE SIGNED!**
- Corporation - by an officer
- Partnership - by a partner
- Joint Venture - by a member
- Individual - by the Owner
- If signature is by a Branch Manager, Estimator, Agent, etc., the bid must be accompanied by a power of attorney authorizing the individual to sign bids, otherwise the bid may be rejected.

Business Address - Firm's Street Address

Mailing Address - P.O. Box or Street Address

BID SECURITY (PROPOSAL GUARANTEE)
Ten percent (10%) of the total amount bid (to include supplemental or additive items).

Type of Bid Security:

Cash - Not recommended; cash is deposited in a clearing account and is returned to bidders by County warrant. This process may take several weeks.

Cashier's or Certified Checks - Will be held until the bid is no longer under consideration. If submitted by a potential awardee, they will be returned when the contract bonds are submitted and approved.

Bid Bonds - Must be signed by the bidder and by the attorney-in-fact for the bonding company. Signature of attorney-in-fact should be notarized and the bond should be accompanied by bonding company's affidavit authorizing attorney-in-fact to execute bonds. An unsigned bid bond will be cause for rejection. If the bid is submitted electronically, then the bidder must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), prior to the bid opening, as more thoroughly specified in the Instructions to Bidders, Section 1.04.A ("Electronic Bid Submittal").

SUBCONTRACTOR LIST (Section 004336)
One firm for each type of work to be subcontracted. Fill out as completely as possible. Name and location of place of business, California contractor's license number, public works contractor registration number issued pursuant to Section 1725.5 of the Labor Code, and description of work to be performed are required to be listed for each subcontractor in accordance with Public Contract Code section 4104.

NON-COLLUSION DECLARATION (Section 004519)
Must be completed, signed, and returned with bid.

EQUAL OPPORTUNITY CLAUSE (Section 004536)
Must be completed, signed, and returned with bid.

DEBARMENT AND SUSPENSION CERTIFICATION (Section 004546)
Must be completed, signed, and returned with bid.

NONLOBBYING CERTIFICATION (Section 004556)
Must be completed, signed, and returned with bid.

DISCLOSURE OF LOBBYING ACTIVITIES (Section 004566)
Must be completed, signed, and returned with bid.

TITLE 13 CARB CERTIFICATION (Section 004556)
Contractors, if applicable, must submit valid Certificates of Reported Compliance with their bid. Subcontractor certificates will be due no later than 4:00 PM on the fifth (5^{th}) calendar day after the bid opening if not submitted with the bid.

GUARANTY OF WORK (Section 006536)
Does not need to be submitted with the bid. (Must be signed and submitted by the successful bidder together with the executed contract and requisite bonds and insurance certificates, within ten days after award of the Project.)

OTHER
If the bid forms have been removed from the specifications booklet, staple the pages together.

Make sure the bid envelope is sealed and shows the project name, bid package and contract number.

If the bid is mailed, allow sufficient time for postal delivery prior to the bid closing time. Bids received after the scheduled time will be returned unopened. Be sure the statement **"DO NOT OPEN UNTIL TIME OF BID OPENING"** is on the envelope.

END OF SECTION

General Info

Total:

$6,763,000.00

Number

24-S-14

Deadline

04/03/2025 02:00 PM PDT

Vendor

Better Enterprises, Inc.

Submitted

04/03/2025 01:39 PM PDT

Signed by

Marc Kerkochian
Account Holder Susan Waid

Opened

04/03/2025 02:02 PM PDT **By** jwongsing@fresnocountyca.gov

Description

Department of Public Health Basement Renovation

The work to be done consists of, in general, the redesign and interior improvements of the basement of the Brix-Mercer Building that was previously damaged by flooding. Interior improvements to consist of the assembly of meeting rooms, offices, and storage occupancies including the construction of new walls, carpeting, and painting, with upgrades to the plumbing, mechanical, fire sprinklers, and electrical systems.

Allows zero unit prices and labor

No

Allows negative unit prices and labor

No

Attachment List

County of Fresno - Project Website
RFC form, bid opening details, any Supplemental Information including RFC responses, Pre-bid Conference information, etc.

Project Manual
Specifications

Plans - County approved (54 MB)
Drawings approved by Fresno County

Plans - Fire Department approved Part 1 (212 MB)
Drawings with notations and approved by Fire Department

Plans - Fire Department approved Part 2 (229 MB)
Drawings with notations and approved by Fire Department

Plans - Fire Department approved Part 3 (207 MB)
Drawings with notations and approved by Fire Department

Instructions to Bidders
Instructions for Completing the Bid Book within the Specifications

Addendum 1 (http://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/design/construction-bidding-opportunities/24-s-14-dph-basement-renovation/00-91-15-addendum-1.pdf)
Addendum 1

Addendum 2 (http://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/design/construction-bidding-opportunities/24-s-14-dph-basement-renovation/00-91-15-addendum-2.pdf)
Addendum 2

Plan Sheet P2.03 - Addendum 2 (http://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/design/construction-bidding-opportunities/24-s-14-dph-basement-renovation/plan-sheet-p2.03-addendum-2.pdf)
Plan Sheet P2.03 - Addendum 2

PROPOSAL TO THE COUNTY OF FRESNO

Contract Name: **DEPARTMENT OF PUBLIC HEALTH BASEMENT RENOVATION**

Contract No.: **24-S-14**

Fund / Subclass / Org / Account / Program or Memo No.: **5620 / 1500 / 08150 / 91760**

The work to be done consists of, in general, the redesign and interior improvements of the basement of the Brix-Mercer Buildings that was previously damaged by flooding. Interior improvements to consist of assembly of meeting rooms, office, and storage occupancies including the construction of new walls, carpeting, and painting, with upgrades to the plumbing, mechanical, fire sprinklers, and electrical systems.

The work to be done is shown on a set of Plans, entitled: “Fresno County Dept. of Public Health Basement Renovation”

Building No.: 611 and 612

Project Address:

1221 Fulton Street

Fresno, CA 93721

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, each issued by a surety satisfactory to the Awarding Authority, within ten (10) days after the award of the contract, the Awarding Authority, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the County.

The undersigned, as bidder, declares that all addenda issued with respect to this bid have been received and incorporated into this Proposal. The bidder’s signature on this Proposal also constitutes acknowledgement of all addenda.

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm or corporation; that the bidder has carefully examined the annexed proposed form of contract, and the plans therein referred to; and the bidder proposes and agrees if this proposal is accepted, that the bidder will contract with the County of Fresno to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the County as therein set forth, and that the bidder will take in full payment therefor the following lump sum price, to-wit:

Proposal Section 004213 - 2 Bid

$6,763,000.00

Item No.	Item Description	Item Price	Extension
1	Base Bid	$6,763,000.00	$6,763,000.00
			Total: $6,763,000.00

Proposal Section 004213 - 3 Acknowledgement of Addendum

Type N/A if no addenda were issued. Click "+" to add additional fields.

Addendum No. *

01

Dated *

03/24/2025

Type N/A if no addenda were issued. Click "+" to add additional fields. 1

Addendum No. *

02

Dated *

03/28/2025

Bid Security Form Section 004313 - 1

Accompanying this proposal is security (check one only) in an amount equal to at least ten percent (10%) of the total amount of the bid:

Bond Percentage

10.00%

Guarantee Method *

Paper Bid Bond, Certified Check, Cashier's Check, Cash, Scan of Paper Bid Bond

Paper Bid Bond, Certified Check, Cashier's Check, Cash, Scan of Paper Bid Bond

Confirmation *

I have provided a Paper Bid Bond for 10.00% of the bid total amount, to the public works office, prior to the solicitation deadline.

If Cash Security, Enter Amount

You must either attach an electronic bid bond here or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), **prior to** the bid opening.

Bid Security Form Section 0014313 - 2

The names of all persons interested in the foregoing proposal as principals are as follows:

Business Name *

Better Enterprises, Inc.

Note: If bidder or other interested person is a corporation, state legal *name of corporation. If bidder is a co-partnership, state* true *name of firm.*

Type of Business *

Corporation

Business Owners and Officers Names *

Marc Kerkochian, President

Note: If bidder or other interested person is:

- *a corporation, list names of the president, secretary, treasurer and manager thereof.*
- *a partnership, list names of all individual co-partners composing firm.*
- *an individual, state first and last name in full.*

Name of Owners and Key Employees *

Marc Kerkochian, President & Owner
Susan Waid, Secretary
Ben Emerzian, Treasurer

Note: List majority owners of your firm. If multiple owners, list all. Also include anyone, including key employees, who are actively promoting the contract. (SB1439)

Licensed in accordance with an act providing for the registration of Contractors:

Class *

B, C33, C-8

Contractor License *	**Expires ***
1012660	04/30/2026

DIR Registration Number *

1000565193

Business Address *

1148 N Cypress Ave, Fresno, CA 93727-6871

Zip Code *

93727

Mailing Address *

1148 N. Cypress Avenue, Fresno, CA

Zip Code *

93727

Business Phone *

(559) 233-2225 x1007

Fax Number

(559) 233-2850

Email Address *

marc@betterenterprisesinc.com

Signature of Bidder *

Better Enterprises, Inc., a California Corporation by Marc Kerkochian, President

Dated *

04/03/2025

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, bidder signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

Subcontractors List Section 004336 - 1

SUBCONTRACTORS

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the total bid presented herewith. Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board. Submission of subcontractor's name, location of business and description of work, California contractor's license number and public works contractor registration number issued pursuant to Section 1725.5 of the Labor Code, all are REQUIRED, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields.

Subcontractor: *

Better Flooring, Inc.

Business Address *

1148 N. Cypress Avenue, Fresno, CA 93727

Class

C15, C54

License No. *

820202

DIR Registration No. *

1000000130

Item No. or Description of Work *

Flooring, Ceramic Tile

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

marc@betterflooringinc.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 1

Subcontractor: *

Best Fire Protection

Business Address *

1201 24th Street, Suite B110-334, Bakersfield, CA 93301

Class

C-16

License No. *

1054075

DIR Registration No. *

1000580773

Item No. or Description of Work *

Fire Sprinklers

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

chris@bestfire.us

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 2

Subcontractor: *

Western Building Materials Co.

Business Address *

4620 E. Olive Avenue, Fresno, CA 93702

Class

C-2

License No. *

248608

DIR Registration No. *

1000003005

Item No. or Description of Work *

Suspended Acoustical Ceilings; Fiberglass Reinforced Panels; Acoustic Wall Panels

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

brian@wbmco.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 3

Subcontractor: *

KC&S Construction Specialties, Inc.

Business Address *

432 Bitritto Way, Unit 3, Modesto, CA 95356

Class

C-61/D28, C-61/D34, C23

License No. *

1048604

DIR Registration No. *

1000063244

Item No. or Description of Work *

WD Doors, HM Frames and Finish Hardware

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

a.landingham@kcsconstructionspecialties.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 4

Subcontractor: *

Fresno Roofing Co., Inc.

Business Address *

5950 E. Olive Avenue, Fresno, CA 93727

Class

C39

License No. *

302777

DIR Registration No. *

1000004536

Item No. or Description of Work *

Roofing

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

ed@fresnoroofingco.net

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 5

Subcontractor: *

Shelco Industries

Business Address *

5425 E. Home Avenue, Suite 101, Fresno, CA 93727

Class

C-61/D34

License No. *

423565

DIR Registration No. *

1000007336

Item No. or Description of Work *

Toilet Partitions; Toilet Accessories; Lockers

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

bobs@shelcoindustries.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 6

Subcontractor: *

Cencal Services, Inc.

Business Address *

3299 S. Cedar Avenue, Fresno, CA 93725

Class

C21, C22, C-8

License No. *

976935

DIR Registration No. *

1000002906

Item No. or Description of Work *

Demolition; Saw Cutting

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

Jamesd@cencaldemo.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 7

Subcontractor: *

Alcal Specialty Contracting, Inc.

Business Address *

2647 N. Weber Avenue, Fresno, CA 93705

Class

C39, C-2, C-35

License No. *

815286

DIR Registration No. *

1000000315

Item No. or Description of Work *

Batt Insulation; Operable Partitions

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

mike.donahoo@alcal.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 8

Subcontractor: *

Valley Air Conditioning & Repair, Inc.

Business Address *

825 S. Topeka Avenue, Fresno, CA 93721

Class

C36, C-4

License No. *

669606

DIR Registration No. *

1000009688

Item No. or Description of Work *

Plumbing

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

sjohnson@valleyairrepair.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 9

Subcontractor: *

San Joaquin Glass

Business Address *

2150 E. McKinley Avenue, Fresno, CA 93703

Class

C-17

License No. *

248167

DIR Registration No. *

1000010471

Item No. or Description of Work *

Storefronts; Glazing

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

anthony@sjglass.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 10

Subcontractor: *

Frontline Plastering, Inc.

Business Address *

2549 N. Bundy Drive, Fresno, CA 93727

Class

C35, C-9

License No. *

1017354

DIR Registration No. *

1000055393

Item No. or Description of Work *

Cold Formed Metal Framing; Gypsum Board; Firestoping; Joint Sealants

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

doug@frontlineplasteringinc.com

Subcontractors List Section 004336 - 2

Optional: Vendor is not required to complete.

SUBCONTRACTORS

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields.

Subcontractor: *

Tarlton & Son, Inc.

Business Address *

3562 S. Elm Avenue, Fresno, CA 93706

Class

C33

License No. *

342341

DIR Registration No. *

1000004368

Item No. or Description of Work *

Painting

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

randyt@tarltonandson.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 1

Subcontractor: *

EI Executive Interiors

Business Address *

1020 S 10th St Fresno Ca 93702

Class

C-6

License No. *

885715

DIR Registration No. *

1000013318

Item No. or Description of Work *

Cabinets/Countertops

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

pfachenda@executiveinteriorsinc.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 2

Subcontractor: *

Strategic Mechanical, Inc.

Business Address *

4661 E. Commerce Avenue, Fresno, CA 93725

Class

C20, C38, C43

License No. *

834679

DIR Registration No. *

1000001726

Item No. or Description of Work *

Mechanical

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

AFornes@strategicmech.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 3

Subcontractor: *

The Boelter Companies, Inc.

Business Address *

9960 Business Park Drive, #120, Sacramento, CA 95827

Class

B

License No. *

1109217

DIR Registration No. *

1001103677

Item No. or Description of Work *

Food Service Equipment

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

kedens@boelter.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 4

Subcontractor: *

Meyers Constructors, Inc.

Business Address *

40488 Brickyard Dr., Madera, CA 93636

Class

B, C51

License No. *

1004811

DIR Registration No. *

1000034927

Item No. or Description of Work *

Rough Carpentry; Structural Steel

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

bryan@meyersconstructors.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 5

Subcontractor: *

A-C Electric Company

Business Address *

P O BOX 81977, Bakersfield, CA 93380

Class

C10

License No. *

99849

DIR Registration No. *

1000000365

Item No. or Description of Work *

Electrical

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

jeff.waughtal@a-celectric.com

Non-Collusion Declaration Section 004519 - 1

CONTRACT: DEPTARTMENT OF PUBLIC HEALTH BASEMENT RENOVATION
CONTRACT NO.: 24-S-14

To the Board of Supervisors, County of Fresno:

NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID *

The undersigned declares:

I am the (Choose one of the following options): *

Corporate Officer

If Corporate Officer please list Title:

President

of (Business Name): *

Better Enterprises, Inc.

the party making the foregoing 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 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 refrain from 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, and has not paid, and will not pay, any person or entity for that 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

Date: *

04/03/2025

at City, State: *

Fresno, California

Signature: *

Marc Kerkochian, President

(See Title 23 United States Code Section 112; Calif Public Contract Code Section 7106)

*NOTE: Completing, signing, and returning the Non-Collusion Declaration is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Equal Opportunity Clause - Section 004536 - 1

CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS

The bidder or proposed subcontractor hereby certifies that they

Please choose an option below *

have not participated

in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925 or 11114, and that they

Please select an option below *

have not filed

with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

Company *

Better Enterprises, Inc.

By: *

Marc Kerkochian

Title *

President

Date *

04/03/2025

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of $10,000 or under are exempt.) Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Director, Office of Federal Contract Compliance, U. S. Department of Labor.

Debarment and Suspension Certification - Section 004546 - 1

TITLE 49, CODE OF FEDERAL REGULATIONS, PART 29

DEBARMENT AND SUSPENSION CERTIFICATION

The bidder or proposed subcontractor under penalty of perjury, certifies that, except as noted below, he/she or any person associated therewith in the capacity of owner, partner, director, officer, manager:

is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;

has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;

does not have a proposed debarment pending; and

has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If no exceptions enter "No Exceptions." If there are any exceptions to this certification, insert the exceptions in the following space: *

No Exceptions

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility.

For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action:

Note: Providing false information may result in criminal prosecution or administrative sanctions.

The above certification is part of the Proposal. Signing the Proposal on the signature portion thereof shall also constitute signature

of this Certification.

By my signature on this proposal, I certify, under penalty of perjury under the laws of the State of California and the United States of America, that the Title 23 United States Code, Section 112 Non-Collusion Declaration and the Title 49 Code of Federal Regulations, Part 29 Debarment and Suspension Certification are true and correct.

Company *

Better Enterprises, Inc.

By *

Marc Kerkochian

Date *

04/03/2025

Title *

President

Nonlobbying Certification For Federal-Aid Contracts - Section 004556

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with awarding of any cooperative agreement, and the extension, continuation, renewal, amendment, or INSTALLATION of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, **the undersigned shall complete and submit Standard Form-LLL, “Disclosure of Lobbying Activities,” in accordance with its instructions.**

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

Bidder *

Better Enterprises, Inc.

By *

Marc Kerkochian

Date *

04/03/2025

Title *

President

Disclosure of Lobbying Activities - Section 004566

Disclosure of Lobbying Activities - Section 004566 (223 KB)
Disclosure of Lobbying Activities

Title 13 CARB Certification Section 004656 - 1

In conformance with Title 13 § 2449(i), bidders will be required to attach copies of valid Certificates of Reported Compliance for the fleet selected for the contract and their listed subcontractors.

Before May 15th of each year, the prime contractor must collect a new valid Certificate of Reported Compliance for the current compliance year, as defined in section 2449(n), from all fleets that have an ongoing contract with the prime contractor as of March 1 of that year. Prime contractors must not write contracts to evade this requirement. Annual renewals must be provided to the Resident Engineer at least one week prior to the expiration date of the current certificate.

https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements

Choose all that apply:

☐ **Bidder's Certificate of Reported Compliance has been attached to the bid.**

☑ **Bidder does not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4).**

☑ **Listed subcontractors' Certificate of Reported Compliance have been attached.**

☐ **The following subcontractors do not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4):**

Subcontractors

☑ **Additional information regarding subcontractor fleets and/or certificates will be submitted within five (5) calendar days of the bid opening.**

FAILURE TO PROVIDE THE CERTIFICATES OF REPORTED COMPLIANCE AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE.

Guaranty Section 006536 - 1

Optional: Vendor is not required to complete.

CONTRACT NO: 24-S-14

This guaranty shall be executed by the successful bidder in accordance with Section 2.32 of the General Conditions. The bidder may execute the guaranty on this page at the time of submitting the bid or may, in the alternative, submit it with the insurance certificates and bonds within ten (10) days after award.

G U A R A N T Y

To the Owner: County of Fresno

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with each individual Work Order Detailed Scope of Work and specifications, due to any of the above causes, all within 365 calendar days after the date on which the Work under this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner. If the undersigned shall fail or refuse to comply with his or her obligations under this guaranty, the Owner shall be entitled to all costs and expenses reasonably incurred by reason of said failure or refusal.

Date: *

04/03/2025

Name (Printed): *

Marc Kerkochian

Signature: *

Marc Kerkochian

Title: *

President

Contractor: *

Better Enterprises, Inc.

Required Documents

Name	Omission Terms	Submitted Fil
Electronic Bid Bond - Scan of Bid Bond Scan of Notarized Paper Bid Bond with original due by 4pm on the 5th calendar day after the bid opening.	I have already provided a bid bond, i.e. through an electronic Surety above or to the public works office prior to the deadline.	County of Fresno DPH Baseme Bond.pdf
Disclosure of Lobbying Activities - Section 004566 Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352	Submit disclosure if needed.	I am not enclosing this docume omission terms have been met
CARB Certification of Reported Compliance - Bidder Valid CARB Certification of Reported Compliance - Bidder	Does not have a fleet subject to this regulation.	I am not enclosing this docume omission terms have been met
CARB Certification(s) of Reported Compliance - Subcontractors Valid CARB Certification(s) of Reported Compliance - Subcontractors	Due by 4pm on the 5th calendar day after bid opening or no listed subcontractors have a fleet subject to this regulation.	BFI E149998_FleetwideCompliance
4 Required Documents		

Additional Documents (use if needed)

Name	Omission Terms	Submitted File
Not Required - Extra Space if needed Not Required - Extra Space if needed	Not Required - Extra Space if needed	I am not enclosing this document because the omission terms have been met.
Not Required - Extra Space if needed Not Required - Extra Space if needed	Not Required - Extra Space if needed	I am not enclosing this document because the omission terms have been met.
Not Required - Extra Space if needed Not Required - Extra Space if needed	Not Required - Extra Space if needed	I am not enclosing this document because the omission terms have been met.
3 Required Documents		

AGREEMENT

THIS AGREEMENT is made at Fresno, in Fresno County, California, by and between **Better Enterprises, Inc**, hereinafter "Contractor", and the County of Fresno, hereinafter "Owner".

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

ARTICLE I. The Contractor agrees to furnish all labor, equipment and materials, including tools, implements, and appliances required, and to perform all the work in a good and workmanlike manner, free from any and all liens and claims of mechanics, materialmen, subcontractors, artisans, machinists, teamsters, and laborers required for:

DEPTARTMENT OF PUBLIC HEALTH BASEMENT RENOVATION
Contract No. 24-S-14

Located at 1221 Fulton Street, Fresno, California, all in strict compliance with the plans, drawings, and specifications therefore prepared by the Director of the Fresno County Department of Public Works and Planning and his authorized representatives, hereinafter called the Project Manager, and other contract documents relating thereto.

ARTICLE II. The Contractor and the Owner agree that the Advertisement (Notice to Bidders), the Wage Scale, the Proposal hereto attached, the Instructions to Bidders, the General Conditions of the contract, the Technical Specifications, the Drawings, and the Addenda and Bulletins thereto, the Contract Bonds and Certificates of Liability and Workers Compensation Insurance, and the Contract Change Orders, together with this Agreement form the Contract Documents, and they are as fully a part of the contract as if hereto attached or herein repeated. The Specifications and Drawings are intended to cooperate so that any work exhibited in the drawings and not mentioned in the specifications, or vice versa, is to be executed the same as if both are mentioned in the specifications and set forth in the drawings, to the true intent and meaning of the said drawings and specifications when taken together. Provided, however, that no part of said specifications that is in conflict with any portion of this Agreement, or that is not actually descriptive of the work to be done thereunder, or of the manner in which the said work is to be executed, shall be considered as any part of this Agreement, but shall be utterly null and void, and anything that is expressly stated, delineated or shown in or upon the specifications or Detailed Scope of Work shall govern and be followed, notwithstanding anything to the contrary in any other source of information or authority to which reference may be made.

ARTICLE III. The Contractor agrees that the work under the contract shall be completed as determined by the Owner within **THREE HUNDRED TEN (310) WORKING DAYS** from the date shown in the Notice to Proceed. Time of performance shall be deemed as of the essence hereof and it is agreed that actual damages to the Owner from any delay in completion beyond the date provided for herein, or any extension thereof until the work is completed or accepted, shall be all provable damages plus liquidated damages in the amount of **ONE THOUSAND FIVE HUNDRED 00/100 DOLLARS ($1,500.00)** per day; that said liquidated damage was arrived at by a studied estimate of loss to the Owner in the event of a delay considering the following damage items which are extremely difficult or impossible to determine: Additional construction expense resulting from delay of completion including, but not limited to, engineering, inspection, rental and utilities; provided, however, the Owner may conditionally accept the work and occupy and use the same if there has been such a degree of completion as shall in its opinion render

the same safe, fit and convenient for the use for which it is intended and in such cases the Contractor and Surety shall not be charged for liquidated damages for any period subsequent to such conditional acceptance and occupation by the Owner but Owner may assess actual damages caused by failure of total completion during such period. The time during which the Contractor is delayed in said work by the acts or neglects of the Owner or its employees or those under it by contract or otherwise, or by the acts of God which the Contractor could not have reasonably foreseen and provided for, or by storms and inclement weather which delays the work, or by any strikes, boycotts, or like obstructive action by employee or labor organizations, or by any general lockouts or other defensive action by employers, whether general, or by organizations of employers, shall be added to the time for completion as aforesaid.

ARTICLE IV. COMPENSATION: The Owner agrees to make payments on account thereof as provided in the General Conditions in the total amount of **SIX MILLION SEVEN HUNDRED SIXTY-THREE THOUSAND AND 00/100 DOLLARS ($6,763,000.00)** in current funds for the performance of the contract which sum is computed as follows: **TOTAL BID LUMP SUM.**

ARTICLE V. The Contractor and the Owner agree that changes in this Agreement or in the work to be done under this Agreement shall become effective only when written in the form of a supplemental agreement or change order and approved and signed by the Owner and the Contractor. It is specifically agreed that the Owner shall have the right to request any alterations, deviations, reductions, or additions to the contract, plans, and/or specifications and the amount of the cost thereof shall be added to or deducted from the amount of the contract price aforesaid by fair and reasonable valuations thereof.

This contract shall be deemed completed when the work is finished in accordance with all Contract Documents as amended by such changes. No such change or modification shall release or exonerate any surety upon any guaranty or bond given in connection with this contract.

ARTICLE VI. In the event of a dispute between the Owner or Project Manager and the Contractor as to an interpretation of any of the specifications or as to the quality of sufficiency of material or workmanship, the decision of the Project Manager shall for the time being prevail and the Contractor, without delaying the job, shall proceed as directed by the Project Manager without prejudice to a final determination by negotiation, arbitration by mutual consent or litigation and should the Contractor be finally determined to be either wholly or partially correct, the Owner shall reimburse them for any added costs they may have incurred by reason of work done or material supplied beyond the terms of the contract as a result of complying with the Project Manager's directions as aforesaid. In the event the Contractor shall neglect to prosecute the work properly or fail to perform any provisions of this contract, the Owner, after three days' written notice to the Contractor, may, without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due to the Contractor, subject to final settlement between the parties as in this paragraph hereinabove provided.

ARTICLE VII. TERMINATION: If the Contractor should be adjudged a bankrupt, or if they should make a general assignment for the benefit of their creditors, or if a receiver should be appointed on account of his insolvency, or if they or any of their subcontractors should persistently violate any of the provisions of the contract, or if they should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper material, or if they should fail to make prompt payment to subcontractors or

for material or labor or persistently disregard laws, ordinances or the instructions of the Project Manager, then the Owner may, upon the certificate of the Project Manager, when sufficient cause exists to justify such action, serve written notice upon the Contractor and their surety of its intention to terminate the contract, such notice to contain the reasons for such intention to terminate the contract, and unless within five (5) days after the serving of such notice, such violations shall cease and satisfactory arrangements for correction thereof be made, the contract shall, upon the expiration of said five days, cease and terminate.

In the event of any such termination, the Owner shall immediately serve written notice thereof upon the surety and the Contractor, and the surety shall have the right to take over and perform the contract, provided, however, that if the surety within ten (10) days after the serving upon it of notice of termination does not give the Owner written notice of its intention to take over and perform the contract or does not commence performance thereof within the ten (10) days stated above from the date of the serving of such notice, the Owner may take over the work and prosecute the same to completion by contract or by any other method it may deem advisable for the account and at the expense of the Contractor, and the Contractor and their surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may without liability for so doing, take possession of and utilize in completing the work, such materials, appliances, plant and other property belonging to the Contractor as may be on the site or the work and necessary therefore. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

If the unpaid balance of the contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and damage incurred through the Contractor's default, shall be certified by the Project Manager.

ARTICLE VIII. The Contractor and his subcontractors shall comply with Sections 1770 – 1780 of the California Labor Code and the provisions of Sections 2.52 and 2.55 of the General Conditions concerning the payment of wages to all workers and mechanics, and the employment and payment of apprentices by the Contractor or any subcontractor for all work performed under this Agreement.

ARTICLE IX. The Contractor and his subcontractors shall comply with Sections 1810 to 1815 of the California Labor Code and the provisions of Section 2.51 of the General Conditions, concerning hours of work and payment of overtime compensation for all work performed under this Agreement.

The Board of Supervisors hereby specifies that portions of the work can only be performed outside the regular working hours as defined in the applicable collective bargaining agreement filed with the Director of Industrial Relations in accordance with Labor Code Section 1773.1, and that the overtime requirements for Saturdays, and holidays are hereby waived for these portions of the work, as more particularly described in the specifications. However, this exemption shall not negate the overtime provisions specified in Labor Code Section 1815.

ARTICLE X. INDEMNIFICATION: To the fullest extent permitted by law, Contractor agrees to and shall indemnify, save, hold harmless and at County's request, defend County and its officers, agents and employees, and the Project Manager and their respective officers, agents and employees, from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to County, or the Project Manager in

connection with the performance, or failure to perform, by Contractor, its officers, agents or employees under this Agreement, and from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to any person, firm or corporation who may be injured or damaged by the performance, or failure to perform, of Contractor, its officers, agents or employees under this Agreement. In addition, Contractor agrees to indemnify County for Federal, State of California and/or local audit exceptions resulting from non-compliance herein on the part of Contractor.

In any and all claims against the County, the Project Manager, or any of their respective officers, agents or employees, initiated by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation set forth in the immediately preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE XI. INSURANCE: Without limiting the Owner's right to obtain indemnification from Contractor or any third parties, Contractor, at its sole expense, in accordance with the provisions of Section 2.40 of the General Conditions, shall maintain in full force and effect the following insurance policies throughout the term of this Agreement, excepting only those policies for which a longer term is specified:

A. Course of Construction (Builder's All Risk) Insurance, with scope and amount of coverage as specified in Section 2.40 E.1 of the General Conditions.

B. Commercial General Liability Insurance, with scope and amount of coverage as specified in Section 2.40 E.2 of the General Conditions.

C. Automobile Liability Insurance, with scope and amount of coverage as specified in Section 2.40 E.2 of the General Conditions.

D. Professional Liability Insurance, with scope and amount of coverage as specified in Section 2.40 E.3 of the General Conditions.

E. Worker's Compensation Insurance, with scope and amount of coverage as specified in Section 2.40 E. 4 of the General Conditions.

The Certificate of Insurance shall be issued in triplicate, to the County of Fresno, and all other participating agencies, whether or not said agencies are named herein, who contribute to the cost of the work or have jurisdiction over areas in which the work is to be performed and all officers and employees of said agencies while acting within the course and scope of their duties and responsibilities.

ARTICLE XII. MISCELLANEOUS PROVISIONS:

1. AUDITS AND INSPECTIONS: The Contractor shall at any time during business hours, and as often as the Owner may deem necessary, make available to the Owner for examination all of its records and data with respect to the matters covered by this Agreement. The Contractor shall, upon request by the Owner, permit the Owner to audit and inspect all of such records and data necessary to ensure Contractor's compliance with the terms of this Agreement. If this Agreement exceeds ten thousand dollars ($10,000.00), Contractor shall be subject to the examination and audit of the Auditor General for a period of three (3) years after final payment under contract (Government Code Section 8546.7).

2. INDEPENDENT CONTRACTOR: In performance of the work, duties, and obligations assumed by Contractor under this Agreement, it is mutually understood and agreed that Contractor, including any and all of Contractor officers, agents and employees, will at all times be acting and performing as an independent contractor, and shall act in an independent capacity and not as an officer, agent, servant, employee, joint venture, partner, or associate of the Owner. Contractor and Owner shall comply with all applicable provisions of law and the rules and regulations, if any, of governmental authorities having jurisdiction over matters of the subject thereof. Because of its status as an independent contractor, Contractor shall have absolutely no right to employment rights and benefits available to Owner's employees. Contractor shall be solely liable and responsible for providing to, or on behalf of, its employees all legally-required employee benefits. In addition, Contractor shall be solely responsible and save Owner harmless from all matters related to payment of Contractor's employees, including compliance with social security, withholding, and all other regulations governing such matters. It is acknowledged that during the term of this Agreement, Contractor may be providing services to others unrelated to the Owner or to this Agreement.

3. DISCLOSURE OF SELF-DEALING TRANSACTIONS: This provision is only applicable if the Contractor is operating as a corporation (a for-profit or non-profit corporation) or if during the term of the agreement, the Contractor changes its status to operate as a corporation. Members of the Contractor's Board of Directors shall disclose any self-dealing transactions that they are a party to while Contractor is providing goods or performing services under this agreement. A self-dealing transaction shall mean a transaction to which the Contractor is a party and in which one or more of its directors has a material financial interest. Members of the Board of Directors shall disclose any self-dealing transactions that they are a party to by completing and signing a Self-Dealing Transaction Disclosure Form, attached hereto as Exhibit A and incorporated herein by reference, and submitting it to the Owner prior to commencing with the self-dealing transaction or immediately thereafter.

ARTICLE XIII. The Contractor represents that he has secured the payment of Workers Compensation in compliance with the provisions of the Labor Code of the State of California and Paragraphs B.3, C.3 and E.4 of Article 2.40 of the General Conditions, and will continue so to comply with such statutory and contractual provisions for the duration and entirety of the performance of the work contemplated herein.

This Contract, **24-S-14**, was awarded by the Board of Supervisors on **May 20, 2025**. It has been reviewed by the Department of Public Works and Planning and is in proper order for signature of the Chairman of the Board of Supervisors.

IN WITNESS WHEREOF, they have executed this Agreement this 24th day of June, 2025

BETTER ENTERPRISES, INC.
(CONTRACTOR)

By:

Name: Marc Kerkochian

Title: President

COUNTY OF FRESNO
(OWNER)

By:
Ernest "Buddy" Mendes, Chairman
of the Board of Supervisors of the
County of Fresno

ATTEST:
Bernice E. Seidel
Clerk of the Board of Supervisors
County of Fresno, State of
California

By:
Deputy

FOR ACCOUNTING USE ONLY
VARIOUS ORGS.
5620 / 1500 / 08150 / 91760

END OF SECTION

GENERAL CONDITIONS

2.01 IDENTIFICATION OF CONTRACT

A. The Agreement shall be signed by the Contractor and the Owner.

B. The Contract Documents are defined in ARTICLE II of the Agreement.

C. The Contract Documents form the Contract for Construction ("Contract"). This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined above. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect of record and the Contractor, but the Architect of record shall be entitled to performance of the obligations of the Contractor intended for their benefit and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner and any Subcontractor or Sub-subcontractor.

2.02 EXECUTION, CORRELATION, AND INTENT OF CONTRACT DOCUMENTS

A. The Contract Documents are complementary and anything called for by one shall be supplied as if called for by all, providing it comes clearly within the scope of the Contract.

B. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. Words and abbreviations that have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

C. Execution of the Contract 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.

D. All work and material shall be the best of the respective kinds specified or indicated. Should any workmanship or materials be required that are not directly or indirectly called for in the Contract Documents, but which nevertheless are necessary for proper fulfillment of the obvious intent thereof, said workmanship or materials shall be the same for similar parts that are detailed, indicated or specified, and the Contractor shall understand the same to be implied and provide for it in his/her tender as if it were particularly described or delineated.

2.03 OWNERSHIP AND USE OF DOCUMENTS

All Contract Documents and copies thereof furnished shall remain the property of the Owner. With the exception of one (1) contract set for each party to the Contract, such documents are to be returned by Contractor or suitably accounted for to the Owner upon request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's common law copyright or other reserved rights. The Owner's use of the documents will not increase the Architect's design liability beyond the Project and the site for which the design was originally intended.

2.04 DEFINITIONS

The following words, or variations thereof, as used in these documents have meanings as defined:

A. The Work – The Work comprises the completed construction required of the Contractor by the Contract Documents, and includes all labor, materials, equipment and services necessary to produce such construction, and all materials, other permits and equipment incorporated or to be incorporated in such construction.

B. The Project – The collective improvements to be constructed by the Contractor pursuant to the construction of the Sheriff Substation, Vehicle/Evidence Storage building, parking, and associated site improvements for Fresno County.

C. Owner – The County of Fresno, State of California, as represented by the Fresno County Board of Supervisors and so named in the Agreement. The term Owner additionally includes the Owner’s authorized representative (also known as the Project Manager) for this Project.

D. Architect of record – The Owner and his/her authorized representative, as defined in Section 2.04C, or a duly California licensed Architect.

E. Contractor – When used in the General Conditions refers to person(s) or entity (partnership or corporation) so named in Agreement and when used in the body of the Specifications, refers to the Contractor for that specific work, whether it be the General Contractor, Subcontractor, or other Contractor. The term Contractor means the Contractor or the Contractor’s authorized representative.

F. Subcontractor – Person, persons, entity, co-partnership or corporation having direct contract with Contractor to perform any of the Work at the site. The term Subcontractor means a Subcontractor or a Subcontractor’s authorized representative. The term Subcontractor does not include any separate contractor or any separate contractor’s subcontractors.

G. Sub-subcontractor – Person, persons, entity, co-partnership or corporation having a direct or indirect contract with a Subcontractor to perform any of the Work at the site (i.e. a second-tier, third-tier or lower-tier Subcontractor). The term Sub-subcontractor means a Sub-subcontractor or an authorized representative thereof.

H. Notice to Proceed – A written notice issued by the Owner directing the Contractor to proceed with construction activities to complete the Project.

I. Technical Specifications – Contains the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

J. Days – All days shall be measured in calendar days unless specifically noted otherwise in these documents or referenced codes.

K. Year – One year shall be measured in terms of 365 calendar days.

2.05 SPECIFICATIONS AND DRAWINGS

A. Precedence – Anything mentioned in the Specifications and not shown on the Drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. Subject to Section 2.02, in cases of discrepancy concerning dimension, quantity and location, the Drawings shall take precedence over the Specifications. Explanatory notes on the Drawings shall take precedence over conflicting drawn indications. Large scale details shall take precedence over smaller scale details and figured dimensions shall take precedence over scaled measurement. Where figures are not shown, scale measurements shall be followed but shall in all cases be verified by measuring actual conditions of Work already in place. In cases of discrepancy concerning quality and application of materials and non-technical requirements over materials, the specifications shall take precedence over Drawings.

B. Division of Specifications – For convenience of reference and to facilitate the letting of independent contracts, this specification may be separated into certain sections; such separation shall not operate to oblige the Owner, Architect or Professional Consultant to establish the limits of any contract between the Contractor and Sub-Contractor each of whom shall depend upon his/her own contract stipulations. The General Conditions apply with equal force to all work, including extra work.

C. Governing Factors – Dimensions figured on drawings shall be followed in every case in preference to scale of drawings.

D. Discrepancies – Should the Contractor, at any time, discover a discrepancy in a drawing or specification, or any variation between dimensions on drawings and measurements at site, or any lacking of dimensions or other information, he/she shall report at once to the Project Manager requesting clarification and shall not proceed with the work affected thereby until such clarification has been made. If the Contractor proceeds with work affected by such discrepancies, without having received such clarification, he/she does so at his/her own risk. Any adjustments involving such circumstances made by the Contractor, prior to approval by the Project Manager, shall be at the Contractor's risk and the settlement of any complications or disputes arising therefrom shall be at the Contractor's sole expense and Contractor shall indemnify, hold harmless and defend Owner, Owner's representatives, and Project Manager from any liability or loss with respect to said adjustments.

E. Scope of Drawings – The drawings shall be held to determine the general character of the Work as well as its details. Parts not detailed shall be constructed in accordance with best standard practice for work of this class, so as to afford the requisite strength and logically complete the parts they compose. Where it is obvious that a drawing illustrates only a part of a given work or of a number of items, the remainder shall be deemed repetitious and so construed. The Contractor shall be responsible for all errors made in using any drawings which have been superseded.

F. Shop Drawings, Product Data and Samples –

1. Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work. Product Data 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. Samples are physical examples that illustrate materials, equipment or workmanship, and establish standards by which the work will be judged.

2. The Contractor shall prepare, review, approve and submit to the Project Manager, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

3. By preparing, approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements and field construction criteria related thereto, or will do so with reasonable promptness, and has checked and coordinated the information contained within such submittals with the requirements of the Work, the Project, the Work Order and the Contract Documents.

4. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data or Samples, unless the Contractor has specifically informed the Project Manager in writing of such deviation at the time of submission and the Architect has reviewed the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's review of them.

5. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications. The cost of such certifications shall be borne by the Contractor. Owner may elect to have an independent certification performed at its own expense. The Owner shall have final approving authority for performance-based items.

6. The Contractor shall direct specific attention, in writing or on resubmitted Shop drawings, Product Data, or Samples, to revisions other than those requested by the Architect on previous submittals.

7. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been reviewed by the Architect. All such portions of the Work shall be in accordance with reviewed submittals.

8. Submission of Shop Drawings and Samples to the Project Manager is required for only those items specifically mentioned in the Specification Sections. If Contractor submits Shop Drawings for items other than the above, the Project Manager will not be obligated to distribute or review them. Contractor shall be responsible for the procuring of Shop Drawings for his/her own use as he/she may require for the progress of the Work.

9. The term "Shop Drawings" as used herein also includes but is not limited to fabrication, erection, layout and setting drawings, manufacturer's standard drawings, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, 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 the positions and layout of each conform to the Contract requirements. As used herein the term "manufactured" applies to standard units usually mass-produced, and the term "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 equipment in proper relation to physical spaces in the structure; and incorporate minor changes of design or construction to suit actual conditions.

10. Drawings: Following Contractor's review and approval, Contractor shall submit to the Project Manager for approval four (4) minimum to six (6) maximum prints and/or PDF submission of the same information via email. (Required delivery methods and quantities of submittals will be determined at the time of the Pre-Construction Meeting.) The Project Manager will check the submittal to see if it is complete. If complete, the Project Manager will forward the drawings to the Owner and the Architect. The Architect and Owner will check the drawings and note Architect and Owner comments and affix a stamp to the drawings indicating the status of acceptance, and will return same to the Project Manager, each retaining prints for his/her records. The Architect or his/her consultants, as applicable, will review the Shop Drawings; mark the prints with required revisions; stamp the prints and indicate “No Exceptions Taken”, “Make Corrections Noted”, “Revise and Resubmit”, “Submit Specified Item”, or “Rejected”, and return the prints. The Project Manager will return the prints to the Contractor. The Contractor shall then print and distribute the appropriate number of copies to his/her job personnel as required. If a drawing is stamped “Rejected” or “Revise and Resubmit”, the Contractor shall correct and resubmit as outlined above. When stamped “Make Corrections Noted”, or similar instructions, the Contractor shall correct and resubmit for record only, three (3) prints of each drawing. Also see Technical Specifications, Division I, General Requirements.

11. Samples: Following Contractor's review and approval, Contractor shall submit to the Architect, five (5) minimum samples of all materials in quantities and sizes as specified herein as requested by the Architect. Submittals shall be given to the Architect at a time determined by the Contractor, which allows for any necessary resubmittal and which will not cause any delay in the Work. Samples will be forwarded to the Architect. If a sample is stamped “Rejected” or “Revise and Resubmit”, one sample so noted will be returned to the Contractor. The Contractor shall correct and resubmit as outlined above. If a sample is stamped "Make Corrections Noted", one sample so noted will be returned. Corrected samples shall be resubmitted for approval as per the original submittal. Also see Technical Specifications and General Requirements.

12. Brochures: Following Contractor's review and approval, Contractor shall submit to the Architect, five (5) copies of all manufacturer's catalogs or brochures as required. Brochures will be forwarded to the Architect for review. If a brochure is stamped "No Exception Taken", two (2) copies will be returned to the Contractor. If stamped "Rejected", one marked copy and two (2) unmarked copies will be returned. Corrected copies shall be resubmitted for approval as per the original submittal. Also see General Requirements.

13. Manufacturer's Instructions: Where any item or work is required by Specifications to be furnished, installed or performed in accordance with a specified product manufacturer's instructions, Contractor shall procure and distribute the necessary copies of such instructions to all concerned parties.

G. Materials – All materials, unless otherwise specified, shall be new and of good quality, proof of which shall be furnished by the Contractor; in case of doubt as to kind or quality required, samples shall be submitted to the Architect through the Project Manager who will specify the kind and use of the material appropriate to the location and the function of the item in question. Contractor shall furnish such item accordingly. Before final payment, all material rejected by the Architect or Project Manager shall be promptly removed from the premises by the Contractor, whether or not completely installed, and promptly and properly replaced with correct materials, including any other work adjoining if disturbed, in accordance with the contract and without expense to the Owner; the Contractor also shall pay for work of other Contractors as is affected by such removals and replacements.

2.06 THE ARCHITECT

A. The Owner may delegate all or a portion of its rights and responsibilities to a California licensed Architect as deemed necessary.

B. The Architect advises the Project Manager in all aspects of the construction phase of the Project. The Architect's functions include advice and assistance to the Project Manager in the correct interpretation and application of the Contract Documents. The Architect is not authorized independently to issue Addenda, Clarifications, Field Orders, Work Authorizations, or Supplemental Work Orders, or in any other way to bind the Owner in discussions with the Contractor.

C. The Contractor shall deliver all correspondence relating to the proper execution of the Work to the Project Manager. The Project Manager reserves the right to consult with the Architect and Owner prior to responding to the Contractor's correspondence.

D. When discussions between the Contractor and the Project Manager occur either on the site or elsewhere, but the Architect is not present, the Project Manager reserves the right to consult with the Architect and Owner prior to issuing his/her final decision or instruction.

E. The Architect shall review or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and the information given in the Contract Documents. Such action shall generally be taken within ten (10) working days, however under certain circumstances such as very complex submittals or if large number of submittals are submitted at one time it may take longer. In this case the Contractor will be notified and given the opportunity to advise the Architect of priorities. The Architect's review of a specific item shall not indicate review of an assembly of which the item is a component.

2.07 THE PROJECT MANAGER

A. The Project Manager is the authorized representative of the Owner in all aspects of administering the construction contract on behalf of the Owner. All communications from and to the Contractor will be channeled through the Project Manager. However, the Project Manager does not have the authority to bind the Owner in matters affecting adjustments to the time or cost of the Project as defined in the Agreement for Construction.

B. The Project Manager will be the Owner's representative during the construction and warranty periods, and until final payment to all contractors is due. The Project Manager will advise and consult with the Owner. All instructions to the Contractor shall be forwarded through the Project Manager. The Project Manager will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument.

C. The Project Manager will be on site during construction to monitor the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of on-site observations and communication with the Contractor, the Project Manager will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.

D. The Project Manager shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so that the Project Manager may perform its functions under the Contract Documents.

E. Based on the Project Manager's observations, and an evaluation of the Contractor's Application for Payment, the Project Manager will determine the amount owing to the Contractor and will issue to the Owner Certificates for Payment incorporating such amount.

F. The Project Manager will be the initial interpreter of the requirements of the Contract Documents and the initial judge of the performance hereunder by the Contractor. The Owner will have final authority of all such matters.

G. The Project Manager will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with agreed upon time limits. Either party to the Contract may make written request to the Project Manager for such interpretations.

H. Claims, disputes and other matters in question between the Contractor and the Project Manager relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred to the Owner (or his/her designee).

I. All interpretations and decisions of the Project Manager will be in writing or in graphic form, and shall be both consistent with the intent of the Contract Documents and reasonably inferable therefrom.

J. The Project Manager will have the authority to reject, or recommend to the Owner the rejection, of any work that does not conform to the Contract Documents. Whenever, in the Project Manager's opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, the Project Manager will have authority to require special inspection or testing of the Work whether or not such work be then fabricated, installed or completed.

K. The Project Manager will receive from the Contractor and review all Shop Drawings, Product Data and Samples, and forward same to Architect and Owner for review.

L. Following consultation with the Owner, the Project Manager will take appropriate action on changes, and will have authority to order minor changes in the Work as provided herein.

M. The Project Manager will conduct inspections to determine the date of Completion, and will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract Documents and assembled by the Contractor. The Project Manager will issue a final Project Certificate for Payment upon compliance with the requirements for completion and final payment. The Project Manager will monitor the warranty for a period of365 Calendar Days from and after the date of acceptance of the Work, unless otherwise specified as a longer term.

N. The duties, responsibilities and limitations of authority of the Project Manager as the Owner's representative during construction, as set forth in the Contract Documents, will not be modified or extended without written consent of the Owner, the Contractor and the Project Manager, which consent shall not be unreasonably withheld. Failure of the Contractor to respond within ten (10) business days to a written request shall constitute consent by the Contractor.

O. In case of the termination of the employment of the Project Manager, the Owner may appoint a successor Project Manager, whose status and duties under the Contract Documents shall be the same as those of the former Project Manager.

2.08 OWNER

A. Information and Services Required of the Owner

1. Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2. Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

3. The Owner shall forward all instructions to the Contractor through the Project Manager.

B. Owner's Right to Stop the Work

If the Contractor fails to correct defective work as required by Section 2.42 herein or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of any contractor or any other person or entity, except to the extent required by Section 2.12.C.

C. Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails after written notice from the Owner to correct such default or neglect with diligence and promptness, the Owner may, after an additional written notice and without prejudice to any other remedy the Owner may have, make good such deficiencies. In such case an appropriate Contract Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the additional services of the Architect or other professionals made necessary by such default, neglect or failure. Such action by the Owner and the amount charged to the Contractor are both subject to the prior approval of the Architect. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner, or Owner may require payment by the surety on the performance or warranty bonds as appropriate. Such action shall, in no way, affect the status of either party under contract, nor be held as a basis of any claim by the Contractor for damages or extension of time.

2.09 CONTRACTOR RESPONSIBILITIES

A. Review of Contract Documents and Field Conditions

1. The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Project Manager any discrepancy or inconsistency that may be discovered. The Contractor shall not be liable to the Owner or the Project Manager for any damage resulting from any such inconsistencies or discrepancies in the Contract Documents unless the Contractor recognized such inconsistencies or discrepancies and knowingly failed to report it to the Project Manager. The Contractor shall perform no portion of the Work at any time unless authorized by the Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

2. Neither the Owner nor the Project Manager or Architect assume any responsibility for an understanding or representation made by any of their agents or representation prior to the execution of the Agreement unless (1) such understanding or representations are expressly stated in the Agreement, and (2) the Agreement expressly provides that responsibility therefor is assumed by the Owner.

3. Failure by the Contractor to acquaint himself/herself with all available information will not relieve him/her from responsibility for estimating properly the difficulty or cost of successfully performing the Work.

4. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Any inconsistencies or discrepancies discovered by the Contractor shall be reported to the Project Manager at once.

5. Before submitting any Request for Information (RFI), or other contractor-initiated request for information, the Contractor shall determine that the information requested is not clearly provided in the Contract Documents. RFI's shall be submitted to the Project Manager only from the Contractor, or Owner, and not from any subcontractor, supplier or other vendor, and shall be on a form approved by the Project Manager. The Contractor shall provide a revised and updated RFI Priority Schedule on a weekly basis. The RFI Priority Schedule shall rank RFI's in order of priority and include a brief statement of reason for priority. Owner initiated RFI's will not be listed on the Contractor's RFI Priority Schedule. The Owner will provide the Architect a separate list of Owner initiated RFI's upon request of the Architect. The Architect will endeavor to respect the order of priorities as requested by the Contractor or Owner for the overall benefit of the Project. The RFI process is for information and clarification only and may not be utilized to obtain approval for changes in Work Order Price or time. Also see Division 01 - General Requirements.

B. Supervision Procedures

1. The Contractor shall efficiently supervise and direct the Work, using therein the Contractor's best skill and diligence for which he/she is remunerated in the Contract Price. The Contractor shall carefully inspect the site and study and compare the Contract Documents, as ignorance of any phase of any of the features or conditions affecting the Contract will not excuse him/her from carrying out its provisions to its full intent.

2. The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed upon written request in each case. The Superintendent who begins the Project shall remain on the Project until the Project is completed, as long as the Contractor employs that person. The Superintendent shall not be replaced without the approval of the Owner.

3. The Contractor shall be responsible to the Owner for the acts and omissions of his/her employees, subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.

4. The Contractor shall at all times enforce strict discipline and good order among his/her employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him/her.

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

6. Contractor shall alert and inform their employees that State law requires that the identities of inmates/wards/patients/clients be kept confidential. Revealing the identities of inmates/wards/patients/clients is punishable by law.

C. Construction Procedures

1. Means and Methods – The Contractor shall be solely responsible for and control of construction means, methods, techniques, sequences, coordination and procedures for all the Work of this contract. Additionally, the Contractor shall be responsible for safety precautions and programs in connection with the Work.

2. Laws of County and State – The Contractor must comply with all laws, rules, regulations, provisions and ordinances of the County in which the Work is being done, and all State laws pertaining to the Work.

3. Safeguards – The Contractor shall provide, in conformity with all local codes and ordinances and as may be required, such temporary walls, fences, guard-rails, barricades, lights, danger signs, enclosures, etc., and shall maintain such safeguards until all work is completed.

4. Housekeeping – Contractor shall keep the premises free of excess accumulated debris. Clean up as required and as directed by the Project Manager. At completion of work all debris shall be removed from the site. Refer to General Requirements for additional requirements.

5. Labor and Materials – Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

6. The Contractor shall deliver to the Project Manager, prior to final acceptance of the Work as a whole, signed certificates from suppliers of materials and manufactured items stating that such items conform to the Contract Documents.

7. The Contractor, immediately upon receipt of the Notice to Proceed (or where shop drawings, samples, etc., are required, immediately upon receipt of review thereof), shall place orders for all materials, work fabrication, and/or equipment to be employed by him/her in connection with that portion of the contracted Work. The Contractor shall keep all materials, work fabrications and/or equipment specified and shall advise the Project Manager promptly, in writing, of all orders placed and of such materials, work fabrications and/or equipment which may not be available in a timely manner for the purposes of the Contract.

8. Any worker whose work is unsatisfactory to the Owner or the Architect, or are considered by the Owner or Architect to be careless, incompetent, unskilled or otherwise unfit, shall be dismissed from work under the Contract upon written request to the Contractor from the Owner or the Architect.

9. Temporary Facilities – Contractor may connect to existing water and electricity available on the site, provided it is suitable to the Contractor's requirements. Water and electricity used will be paid by the Owner. Contractor shall bear all expenses for carrying the water or electricity to the appropriate locations and to connect or tap into existing lines. Toilet facilities may be available on a site to the workmen engaged in the performance of this contract. It shall be the responsibility of the Contractor to confirm with the Owner the availability of toilet facilities on the site. The use of such facilities may be revoked in the event of excess janitorial requirements.

10. Contractor shall not perform any fire hazardous operation adjacent to combustible materials. Any fire hazardous operation shall have proper fire extinguisher close by and the adjacent area shall be policed before stopping work for the day. Contractor shall provide not less than one OSHA/NFPA Class 6-ABC fire extinguisher for each 9,000 square feet of Project area or fraction thereof.

11. Contractor shall erect temporary dust separation partitions and floor mats as necessary to confine dust and debris within area of work. Contractor shall post signs, erect and maintain barriers and warning devices for the protection of the general public and Owner personnel.

12. Trenching and Excavation – In accordance with Section 7104 of the California Public Contract Code, the following provisions shall apply to any contract involving digging of trenches or other excavations that extend deeper than four (4) feet below the surface:

    a. The Contractor shall promptly, and before the following conditions are disturbed, notify the Owner, in writing, of any:

        i. 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 provisions of existing law.

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

        iii. 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.

    b. The Owner 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 Contract Change Order in accordance with the provisions of Section 2.09 of the General Conditions.

    c. In the event that a dispute arises between the Owner 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 scheduled completion date provided for 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.

2.10 SUBCONTRACTORS

A. Agreements – Agreements between the Contractor, Subcontractors, and Subcontractors of lower tier shall be subject to the approval of the Owner, but in no case does such approval relieve the Contractor of any conditions imposed by the Contract Documents. The Contractor shall only use those subcontractors that are required to be listed and included in his/her sealed bid Subcontractor List, section 004336, unless any proposed substitution is first approved by the Owner pursuant to statute. The Contractor shall not use any subcontractor who is ineligible to perform work on a Public Works Project pursuant to section 1777.1 or 1777.7 of the Labor Code. Notwithstanding any other provision of the Contract Documents, subcontractors may be added, deleted or substituted only in accordance with the provisions of Public Contract Code Section 4100 et seq.

B. Relation with Subcontractor – By an appropriate agreement, written where legally required for enforceability, the Contractor shall bind every Subcontractor and require therein that every Subcontractor agrees to be bound by the terms of the Contract Documents to carry out their provisions insofar as applicable to their work; and the Contractor further agrees to pay to each Subcontractor promptly upon issuance of Certificate of Payment, his/her or their due portion. Said agreement shall preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor Agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, under the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with their Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of Contract Documents available to their Sub-subcontractors. Nothing contained herein shall be deemed to create an agency relationship between the Owner and any Subcontractor or material supplier.

C. Owner's Relation – Neither the acceptance of the name of Subcontractor nor the suggestion of such name nor any other act of the Owner or Architect nor anything contained in any Contract Document is to be construed as creating any contractual relation between the Owner (or Owner’s authorized representatives) and any Subcontractor of any tier nor as creating any contractual relation between the Architect and any Subcontractor of any tier.

D. All Subcontractors employed by the Contractor shall be appropriately licensed in conformity with the laws of the State of California.

E. Jurisdictional disputes between Subcontractors or between Contractor and Subcontractor shall not be mediated or decided by the Owner or the Architect. The Contractor shall be responsible for the resolution of all such disputes based upon his/her contractual relationship with his/her Subcontractors.

2.11 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

A. The Owner reserves the right to perform work related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that the Owner's action results in delay, damage or additional cost attributable thereto, the Contractor shall make such claim as provided elsewhere in the Contract Documents.

B. When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

C. The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. 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, separate contractors, and the Owner, until subsequently revised.

D. Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations 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 Conditions of the Contract.

2.12 MUTUAL RESPONSIBILITY

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

B. When any part of the Contractor's Work depends upon proper execution or results of the work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Project Manager any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acceptance of the Owner's or separate contractor's work as fit and proper to receive the Work, except as to defects which may subsequently become apparent in such work by others.

C. If, following the reporting of any discrepancy or defect as required herein above, the Contractor suffers damage due to disruption or delay caused by the separate contractor, without fault by the Owner, the Contractor's remedy shall be limited to seeking recovery from the separate contractor.

D. Any costs caused by defective or ill-timed work shall be borne by the Contractor responsible therefor.

E. Should the Contractor cause damage to the work or property of the Owner, or to other work or property on the site, the Contractor shall promptly remedy such damage as provided herein.

F. Should the Contractor wrongfully delay or cause damage to the work or property of any separate contractor, the Contractor shall, upon due notice, promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues the Owner on account of any delay or damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings, and if any judgment or award against the Owner (or Owner's authorized representatives) arises therefrom, the Contractor shall pay or satisfy such judgment or award in full and shall reimburse the Owner for all costs which the Owner has incurred in connection with such matter.

2.13 OWNER'S RIGHT TO CLEAN UP

If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required in the Contract Documents, the Owner may clean up and the contractor responsible shall pay Owner such portions of the cost as the Project Manager shall determine to be just.

2.14 GOVERNING LAW

The Contract shall be governed by the law of the State of California.

2.15 INSPECTION

A. All material and workmanship (if not otherwise designated by the Contract Documents) shall be subject to inspection, examination, and test by the Owner and Project Manager at any and all times during manufacture and/or construction and at any and all places where such manufacture and/or construction are carried on. The Owner and Project Manager shall have the right to reject defective material and workmanship or require its correction.

B. The Contractor shall furnish promptly without additional charge, all reasonable facilities, labor, and materials necessary for the safe and convenient inspection and tests that may be required by the Owner and Project Manager.

C. Where the Contract Documents, instructions by the Owner, laws, ordinances, or any public authority having jurisdiction requires work to be inspected, tested or approved before work proceeds, such work shall not proceed, nor shall it be concealed prior to inspection.

D. The Contractor shall give the Project Manager at least two (2) business days advance notice of the readiness for any Contract compliance inspection by the Inspector. The Contractor shall give notice as required by all other inspecting and testing agencies of jurisdiction for Code and regular compliance inspection. In all cases, the Contractor shall schedule inspections so as not to delay the Work.

E. If the Project Manager determines that any work requires additional special inspection beyond that identified in the specifications, the Project Manager will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided above. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Project Manager's additional services, testing or inspections made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Contract Change Order shall be issued.

F. Should it be considered necessary or advisable by the Project Manager at any time, either before acceptance of the entire Work, or after acceptance and within the guaranty period, to make an examination of work already completed, by removing or tearing out same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any material respect, due to the fault of the Project Manager or his/her Subcontractors, he/she shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, any compensation deemed appropriate shall be handled by issuance of a Contract Change Order to the Contractor and he/she shall, in addition, if completion of the work has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

G. Required certificates of inspection, testing, or approval shall be secured by the Contractor and the Contractor shall promptly deliver them to the Project

Manager for review and evaluation of compliance with the appropriate specifications and standards.

H. When the work is completed, the Contractor shall notify the Project Manager in writing that the work will be ready for final inspection and test on a definite date, which shall be stated in such notice.

2.16 TAXES, PERMITS, FEES, AND INDEMNIFICATION FOR PATENT INFRINGEMENT CLAIM

A. The Contractor shall pay for and include all Federal, State, and local taxes direct or indirect for the work or portions thereof provided by the Contractor which are legally enacted at the time the Notice to Proceed is issued, whether or not yet enacted, and secure and pay all fees and charges for permits and licenses, unless otherwise specified.

B. Royalty and license fees incidental to the use of any patented material, device, or process shall be paid by the Contractor and in the event of a claim of alleged infringement of patent copyright, or Trade Secret rights, the Contractor shall indemnify, save the Owner (and Owner’s authorized representatives) free and harmless, and defend, at the Contractor's own expense, any and all suits that may be brought in such connection.

C. Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for the building permit, permanent utility connection fees, and right-of-way encroachment permit. The Contractor shall secure and pay for temporary construction utilities, and all other permits and governmental fees, licenses, and inspections necessary for the proper execution and completion of the Work.

D. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the performance of the Work.

E. It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, the Contractor shall promptly notify the Project Manager in writing, and any necessary changes shall be accomplished by appropriate Modification.

F. If the Contractor performs any work knowing it to be contrary to any laws, ordinances, rules, and regulations, without notice to the Project Manager, the Contractor shall assume full responsibility therefor and shall bear all costs attributable thereto.

G. Any reference in the Contract Documents to codes, standard specifications, or manufacturer's instructions, shall mean the latest printed edition of each in effect at the Contract date.

2.17 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Within thirty (30) calendar days after receipt of Notice to Proceed, the Contractor shall submit a Construction Schedule in CPM (Critical Path Method) form to the Project Manager for approval. The Construction Schedule shall be sufficiently detailed to accurately depict all the work required by the Contract. CPM Construction Schedule shall reflect shop drawings; submittals due and return dates, fabrication and delivery times, cost loading, crew mix, and equipment loading data. The Contractor shall thereafter adhere to the Construction Schedule, as updated monthly, or as necessary in accordance with the Contract Documents, including any scope changes or changes in the work approved by the Owner during the course of construction. "Slack" or "float" time on the CPM Construction Schedule is not intended, and shall not be, for the sole benefit of either the Owner or Contractor.

B. Within fourteen (14) calendar days after the pre-construction conference, the Contractor shall provide a Submittal and Procurement Schedule indicating time periods for review of Shop Drawings, Data, Samples, and procurement of material and equipment required for the Work. Contractor shall allow time for submittal review in accordance with the General Requirements Section – Construction Progress Documentation. All items that require review by the Project Manager and/or are not readily available from stock and requiring more than thirty-five (35) days lead-time shall be included in the Submittal and Procurement Schedule. Items listed in the Submittal and Procurement Schedule shall also be identified as activities on the CPM Construction Schedule. Contractor shall identify items requiring coordination with work of separate contractors. The working day to calendar date correlation shall be based upon the Contractor’s proposed work week with adequate allowance for legal holidays, days lost due to abnormal weather, and any special requirements of the Project.

C. The Construction Schedule shall be prepared and maintained by the Contractor.

D. The Owner, Project Manager, Contractor, and other Contractor(s) shall jointly review the progress of the work weekly. Should this review, in the opinion of the Project Manager, indicate that the work is behind the schedule established by currently reviewed Construction Schedule, the Contractor shall either (a) provide a plan to the Project Manager indicating the steps the Contractor intends to take in order to recover the time behind schedule and conform to the reviewed Construction Schedule; or (b) submit a revised Construction Schedule for completion of the work, remaining within the contract completion time, to the Project Manager for review by the next weekly meeting. If the Contractor’s recovery or revised schedule requires work to occur during other than normal working hours, the Contractor will be responsible for any resulting costs incurred by the Owner, including but not limited to, the costs for construction management, contract administration, inspection, testing, and staffing.

E. The Contractor shall deliver copies of his/her daily job logs to the Project Manager and Owner on a weekly basis or as otherwise agreed to by Owner. At a minimum, the Contractor's daily job log should include the sub-contractors working onsite, number of workers and their trade classification, description of work, visitors, temperature and weather conditions, accidents, delays, and any other important information pertaining to the Project that day. The Contractor will schedule and coordinate the Work of all sub-contractors on the Project. The Contractor will keep the Sub-contractors informed of the Construction Schedule to enable the Contractor to plan and perform the Work properly.

2.18 RECORDS, DOCUMENTS, AND SAMPLES AT THE SITE

A. The Contractor shall maintain all records of required Review Agencies, County, or State inspections, and shall promptly notify the Project Manager of the results of any inspection. Copies of all such records shall be provided to the Owner.

B. The Contractor shall secure and maintain required certificates of inspection, testing, or approval and shall promptly deliver them to the Project Manager.

C. The Contractor shall maintain at the Project site, on a daily basis, one (1) record copy of all Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record all changes made during construction, and reviewed Shop Drawings, Product Data, and Samples. These shall be available to the Project Manager and the Owner and reviewed weekly, and shall be delivered to the Project Manager for forwarding to the Owner upon completion of the Project. The Contractor shall advise the Project Manager on a current basis of all changes in the Work made during construction. Payment may be withheld from Contractor for failure to maintain current Record Documents.

2.19 USE OF SITE

A. The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.

B. The Contractor shall coordinate all of the Contractor's operations with, and secure approval from, the Project Manager before using any portion of the site. Also see Technical Specifications, Division 01, General Requirements.

2.20 CUTTING AND PATCHING OF WORK

A. The Contractor shall be responsible for all cutting, fitting, or patching that may be required to complete the Work or to make its several parts fit together properly.

B. The Contractor shall not damage or endanger any portion of the Work or the work of the Owner, or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Contractor shall not unreasonably withhold from the Owner or any separate contractor consent to cutting or otherwise altering the Work.

C. The Contractor in all cases shall exercise extreme care in any cutting operations, and perform such operations under adequate supervision by competent mechanics skilled in the applicable trade. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting damage, etc., will not be tolerated, and the Contractor will be held responsible for such avoidable or willful damage.

D. All replacing, patching, and repairing of all materials and surfaces cut or damaged in the execution of the Work shall be performed by experienced mechanics of the several trades involved. All work of such nature shall be done with the applicable materials, in such a manner that all surfaces so replaced, repaired, or patched, will, upon completion of the Work, match the surrounding similar surfaces.

2.21 CLEANING UP

A. The Contractor shall at all times keep the premises free from accumulation of waste materials or rubbish caused by the Contractor's operations. At the completion of the Work, the Contractor shall remove all the Contractor's waste materials and rubbish from and about the Project as well as all the Contractor's tools, construction equipment, machinery and surplus materials.

B. If the Contractor fails to clean up at the completion of the Work, the Owner may do so, and the cost thereof shall be paid by the Contractor.

2.22 INDEMNIFICATION

A. To the fullest extent permitted by law, Contractor agrees to and shall indemnify, save, hold harmless and at Owner’s request, defend Owner and its officers, agents and employees, and the Architect and Consultants and their respective officers, agents and employees, from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to Owner, the Architect or Consultants in connection with the performance, or failure to perform, by Contractor, its officers, agents or employees under this Agreement, and from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to any person, firm or corporation who may be injured or damaged by the performance, or failure to perform, of Contractor, its officers, agents or employees under this Agreement. In addition, Contractor agrees to indemnify Owner for Federal, State of California and/or local audit exceptions resulting from non-compliance herein on the part of Contractor.

B. In any and all claims against the Owner, the Architect or Consultants, or any of their respective officers, agents or employees, initiated by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation set forth in the immediately preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

2.23 FAIR EMPLOYMENT PRACTICES CLAUSE

Nondiscrimination: In connection with the performance of Work under the contract, the Contractor agrees (as prescribed in Chapter 6 of Division 3 of Title II of the Government Code of the State of California, commencing at Section 12900 and by Labor Code Section 1735) not to discriminate against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, or sex. The aforesaid provisions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, Notices to be provided by the County, setting forth the provisions of this discrimination clause. The Contractor further agrees to insert the foregoing provisions in all subcontracts hereunder, except subcontracts for standard commercial supplies of raw materials.

2.24 PAYMENT

A. CONTRACT SUM

The Contract Sum is stated in the Owner-Contractor Agreement ("the Agreement"), Section 005213, and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents.

B. SCHEDULE OF VALUES

Before the first Application for Payment, and within eight (8) days of the bid opening, the Contractor shall submit to DesignServices@fresnocountyca.gov a Schedule of Values allocated to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Project Manager may require. This schedule, unless objected to by the Project Manager, shall be used only as a basis for the Contractor's Applications for Payment.

C. APPLICATIONS FOR PAYMENT

The Owner will make progress payments to the Contractor upon completion of portions of the Work, as covered by the Contract Documents, in accordance with established Owner procedures. Before submitting an Application for Payment (Final or Partial), the Contractor shall reach an agreement with the Project Manager (in consultation with the Architect) concerning the percentage complete of the Work and the dollar value for which the Application for Payment may be submitted.

1. On or about the twentieth (20th) day of the month in which the work was performed, the Contractor shall submit to the Project Manager an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Owner or the Project Manager may require, including appropriate updates to the Construction Schedule, and reflecting retainage, if any, as provided elsewhere in the Contract Documents. Payment is expressly conditioned upon submission by the Contractor of conditional and unconditional waivers and release of lien rights upon progress payment as the Owner or the Architect may require. Waiver and Release forms must be submitted on forms approved by the Owner. Copies of said forms shall comply with Civil Code Section 8132 through 8138, inclusive.

2. Unless otherwise provided in the Contract Documents, payments may be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the Owner, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

3. The Contractor warrants that title to all work, materials, and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, stop notices, claims, security interest or encumbrances, hereinafter referred to as "liens"; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

4. On or about the twentieth (20^{th}) day of the month following the month in which the work was performed, the Owner shall pay to the Contractor ninety-five percent (95%) of the value of said work in place, as checked and approved by the Project Manager. The balance of five percent (5%) of the estimate shall be retained by the Owner until the time of

final acceptance of said work. In lieu of the five percent (5%) retainage, the Contractor may substitute securities as provided herein below.

a. If the Owner does not pay the Contractor within thirty (30) days after receipt of an undisputed and properly submitted payment request for a progress payment, excluding that portion of the final payment designated by the contract as retention earnings, then the Owner shall pay interest to the Contractor as provided by Public Contract Code Section 20104.50. Said interest penalty is the sole recourse of Contractor and Contractor shall have no right to stop the Work until payment of the amount owing has been received, nor shall the contract completion time be extended, nor shall the Contract Sum be increased in any way, including by reason of any costs incurred by Contractor, except to the extent of said interest payment.

b. Pursuant to Public Contract Code Section 7107, in the event of a dispute between the Owner and Contractor, the Owner may withhold from the final payment an amount not to exceed one hundred and fifty percent (150%) of the disputed amount. Except as so provided, the Owner shall release the retention withheld within sixty (60) days after the date of completion of the Work, as "completion" is defined in Public Contract Code Section 7107. In the event that retention payments are not made within the time periods required by Public Contract Code Section 7107, the Owner may be subject to the interest provisions of Public Contract Code Section 7107.

5. Security Substitutions and Escrow for Moneys Withheld to Insure Contractor's Performance. Pursuant to Public Contract Code section 22300, the Contractor may deposit in an escrow, equivalent securities for any moneys withheld to ensure performance and have said moneys paid directly to Contractor, or, in the alternative, have the Owner deposit such moneys directly into an escrow. Upon the closing of any such escrow, Contractor shall pay to each Subcontractor, not later than twenty (20) days after receipt of the closing payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount of retention withheld to insure the performance of the Contractor. Any escrow established pursuant to this article shall be with a state or federally chartered bank, shall be at the sole expense of the Contractor, and shall be established using an escrow agreement in substantially the following form:

(Begin Escrow Agreement)

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between the County of Fresno, (hereinafter called "Owner"), _____, (hereinafter called "Contractor"); and _____, a state or federally chartered bank in California, (hereinafter called "Escrow Agent").

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for _____ in the amount of $_____, and dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within ten (10) days of the deposit. The market value of the securities at the time of the substitution, as valued by the Owner, shall be at least equal to the cumulative total cash amount then required to be withheld as retention under the terms of the contract between Owner and Contractor. If the Owner determines that the securities are not adequate, it will notify Contractor and Escrow Agent, and Contractor shall deposit additional security as further determined by the Owner. Securities shall be held in the name of the Owner and shall designate the Contractor as the beneficial owner.

2. Securities eligible for investment under subdivision (c) of the above-referenced Section 22300 shall include those listed in Section 16430 of the Government Code, and shall also include bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, and standby letters of credit. Deposit of any other type of security may be permitted only by mutual agreement of the Contractor and the Owner, evidenced by an amendment to this agreement executed by all of the parties hereto.

3. Upon the deposit of adequate securities, Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions.

4. When the Owner, at Contractor's written request, makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

5. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. The Owner, Contractor, and Escrow Agent shall determine these expenses and payment terms.

6. The interest earned on the securities, or the money market accounts held in escrow, and all interest earned on that interest, shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

7. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

8. The Owner shall have the right to draw upon the securities or any amount paid directly to Escrow Agent in the event of default by the Contractor. Upon seven (7) days written notice to the Escrow Agent from the Owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash, including any amounts paid directly to Escrow Agent, as instructed by the Owner. Escrow Agent shall not be concerned with the validity of any notice of default given by Owner pursuant to this paragraph, and shall promptly comply with Owner's instructions to pay over said escrowed assets. Escrow Agent further agrees not to interplead the escrowed assets in response to conflicting demands and hereby waives any present or future right of interpleader.

9. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.

10. Escrow Agent shall rely on the written notifications from the Owner and Contractor pursuant to Sections (6), (7), (8), and (9) of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

11. The venue of any litigation concerning the rights and obligations of the parties to this agreement shall be the County of Fresno and the parties hereto waive the removal provisions of Code of Civil Procedure Section 394.

12. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On Behalf of Owner:

Title **– Business Manager**

Name **– Lemuel Asprec**

Signature

Address: **2220 Tulare St, 6th Floor**
Fresno, CA 93721

On behalf of Contractor:

Title

Name

Signature

Address:

On behalf of Escrow Agent:
Title

Name

Signature

Address

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

Owner:
Title **– Steve White, Director**

Department of Public Works and Planning

Signature

Address **– 2220 Tulare St, 6th Floor**
Fresno, CA 93721

Contractor:
Title

Name

Signature

Address

Escrow Agent:
Title

Name

Signature

Address

(End Escrow Agreement)

6. Itemized Breakdown: The Contractor shall submit a financial breakdown of the work, itemized by crafts or sections as designated by the Owner. The Contractor's payment shall be based upon the monthly percentage of completion of these items.

7. Lien Waivers: The Owner may require the Contractor to submit, along with the progress payment request, notarized lien waivers from each Subcontractor, materials, or equipment supplier. Lien waivers shall comply with Civil Code Section 8132, et seq., and the aggregate sum thereof shall reflect all progress payments previously made.

D. CERTIFICATES FOR PAYMENT

1. The Project Manager shall, within seven (7) days after the receipt of the Project Application for Payment, review the Project Application for Payment and either issue a Project Certificate for Payment to the Owner for such amounts as the Project Manager determines are properly due, or notify the Contractor in writing of the reasons for withholding a Certificate provided in Part F of this Section 2.24.

2. The issuance of a Project Certificate for Payment will constitute a representation by the Project Manager to the Owner that, based on the Project Manager's observations at the site as provided herein and the data comprising the Project Application for Payment, the Work has progressed to the point indicated and that, to the best of the Project Manager's knowledge, information and belief, the quality and timeliness of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Completion of the Work, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in the Certificate); and that based upon all currently available information, the Contractor is entitled to payment in the amount certified. However, by issuing a Project Certificate for Payment, the Project Manager shall not thereby be deemed to represent that the Project Manager has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, has reviewed the construction means, methods, techniques, sequences, or procedures, or has made any examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract Sum.

E. PROGRESS PAYMENTS

1. After the Project Manager has issued a Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents.

2. The Contractor shall promptly pay each Subcontractor upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contract on account of such Subcontractor's Work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to their Sub-subcontractors in similar manner.

3. The Project Manager may on request of any Subcontractor, at the Project Manager's discretion, furnish to that Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Project Manager on account of Work done by such Subcontractor.

4. Neither the Owner nor the Project Manager shall have any obligation to pay or to see to the payment of any monies to any Subcontractor or Material Suppliers except as may otherwise be required by law.

5. Neither certification of a progress payment, delivery of a progress payment, nor partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not performed in accordance with the Contract Documents.

F. PAYMENTS WITHHELD

1. The Project Manager may decline to certify payment and may withhold the Certificate in whole or in part to the extent necessary to reasonably protect the Owner, if, in the Project Manager's opinion, the Project Manager is unable to make representations to the Owner as provided herein above for Certificates for Payment. If the Project Manager is unable to make representations to the Owner and certify payment in the amount of the Project Application, the Project Manager will notify the Contractor as provided herein. If the Contractor and the Project Manager cannot agree on a revised amount, the Project Manager will promptly issue a Project Certificate for Payment for the amount for which the Project Manager is able to make such representations to the Owner. The Project Manager may also decline to certify payment or, because of subsequently discovered evidence or subsequent observations, the Project Manager may nullify the whole or any part of any Project Certificate for Payment previously issued to such extent as may be necessary, in the Project Manager's opinion, to protect the Owner from loss because of:

   a. Defective Work not remedied;
   b. Third party claims filed or reasonable evidence indicating probable filing of such claims, including claims by separate contractors;
   c. Failure of the Contractor to make payments properly to Subcontractors, or for labor, materials or equipment;
   d. Architect’s determination, based upon reasonable evidence, that the Work cannot be completed for the unpaid balance of the Contract Sum;

e. Damage to the Owner or another contractor;
f. Architect's determination, based upon reasonable evidence, that the Work will not be accomplished in compliance with the Work Order Completion Time;
g. Persistent failure to carry out the Work in accordance with the Contract Documents;
h. Failure of the Contractor to submit Construction Schedules or Submittal and Procurement Schedules as required;
i. Failure of the Contractor to maintain record drawings on a current basis;
j. Failure of the Contractor to submit notarized lien waivers from each Subcontractor, materials, or equipment supplier;
k. Failure of the Contractor to submit certified payroll reports;
l. Stop notice served upon the Owner.

2. A retention in the amount of one-thousand dollars ($1,000) will be withheld from the Contractor's monthly progress payment for each and every required document not submitted in a timely manner by the Contractor or its subcontractors up to a maximum of ten-thousand dollars ($10,000). For purposes of this Paragraph, the term "required document" includes, but is not limited to, certified payrolls, labor compliance documents, Disadvantaged Business Enterprise documents, and any other information or documents required to be submitted by the Contractor or any of its subcontractors under the terms of this Agreement or pursuant to applicable federal, state, or local laws or regulations. The retention provided for in this Paragraph shall be in addition to any other deduction or retention allowed under this Agreement, and shall be in addition to any other remedy or consequence provided by law for untimely submission of any required document. Such retention shall remain in effect only until such time as the required documents have been submitted by the Contractor or its subcontractor(s) and have been determined by the Owner to be both complete and acceptable as to form.

3. When the grounds as noted above are removed, payment shall be made for amounts withheld on the basis thereof.

G. COMPLETION AND FINAL PAYMENT

1. Following the Contractor's completion of the Work, the Contractor shall forward to the Project Manager a written notice that the Work is ready for final inspection and acceptance, and shall also forward to the Project Manager a final Application for Payment. Upon receipt, the Project Manager will promptly make such inspection. When the Project Manager finds the Work acceptable under the Contract documents and the Contract fully performed, the Project Manager will issue a Project Certificate for Payment which will certify the final payment due the Contractor. This certification will constitute a representation that, to the best of the Project Manager's knowledge, information and belief, and on the basis of observations and inspections, the Work has been completed in accordance with the Terms and Conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said Certificate, is due and payable. The Project Manager's certification of said Project Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth herein below have been fulfilled.

2. Neither the final payment nor the remaining retainage shall become due until the Contractor submits to the Project Manager (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment, and (3) other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against any such lien. The bond cannot be from the original surety insurer for the Project or any affiliate of the original surety. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien.

3. All provisions of this Agreement, including without limitation those establishing obligations and procedures, shall remain in full force and effect notwithstanding the making or acceptance of final payment, and the making of final payment shall not constitute a waiver of any claims by the Owner.

4. Upon completion and acceptance of all work whatsoever required, and upon the release of all claims against the Owner as specified, the Owner shall file a written Notice of Completion with the County Recorder as to the entire amount of work performed.

5. Final payment will be released within sixty (60) days after the date of acceptance of the Work as reflected in the Notice of Completion filed with the County Recorder's Office; provided, that Owner may withhold from the final payment, in the event of a dispute between Owner and Contractor, retentions in, and amount not exceeding, one hundred fifty percent (150%) of the disputed amount. At the Contractor's option, the Owner may release retention upon receipt of an unconditional lien release for the full value of the Work and any of its Contract Change Orders.

6. All manufacturers' warranties required by the Contract Documents shall commence on the date of the Notice of Completion for the Work. It shall be the Contractor's responsibility, through appropriate contractual arrangements with all subcontractors, materialmen, and suppliers, to ensure compliance with this requirement.

7. The acceptance by the Contractor of the final payment, after the date of Notice of Completion of the Project, shall be and shall operate as a release to the Owner of all claims and of all liability to the Contractor, under the Contract Documents or otherwise, for all things done or furnished in connection with this Work, excepting only the Contractor's claims for interest upon final payment, if such final payment be improperly delayed. No payments, however, final or otherwise, shall operate to release the Contractor or his/her sureties from any obligations under the Contract Documents, including but not limited to the Performance and Payment Bonds.

2.25 CHANGES TO THE WORK

A. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletion, or other revisions. All such changes in the Work shall be authorized by a Contract Change Order, and shall be performed under the applicable conditions of the Contract Documents.

B. CONTRACT CHANGE ORDER: A Change Order issued to add or delete Work from the Contract. Only an executed Contract Change Order will effectuate change in either the Contract Sum and/or the contract time. A Change Order is a written order to the Contractor dually signed to show both the approval of the Architect and Authorization of the Owner, issued after execution of the Contract. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including any adjustment in the Contract Sum or the contract time, and the full and final settlement of all costs (direct, indirect, and overhead) related to the Work authorized by the Change Order.

C. All claims for additional compensation to the Contractor shall be presented in writing before the expense is incurred, and will be adjusted as provided herein. No work shall be allowed to lag pending such adjustment, but shall be promptly executed as directed, even if a disputed claim arises. No claim will be considered after the work in question has been done unless a Contract Change Order has been issued or a timely written notice of claim has been made by Contractor.

D. Costs mean an itemized breakdown of all labor (by crafts), materials, sales taxes, equipment rentals, etc., for each portion of the Work which comprises the Change Order including any Subcontractor's itemized breakdown, plus not more than twenty percent (20%) to cover all profits and administration.

1. Under no circumstance will the total sum of allowable mark up for General Conditions, General Requirements, supervision, overhead (excluding small tools) and profit, exceed a cumulative total of twenty percent (20%), including markups for all parties involved in a change.

i. Work done by Contractor's own forces, not including bond and insurance premiums, shall not exceed a cumulative total of fifteen percent (15%);

ii. Work done by subcontractors, all tiers, including bond and insurance premiums, if any, shall not exceed a cumulative total of fifteen percent (15%);

iii. General Conditions, General Requirements, Supervision, Overhead and Profit for Contractor on Subcontractor's work, shall not exceed a cumulative total of five percent (5%).

2. The cost or credit to the Owner resulting from a change in the Work shall be determined in one or more of the following ways:

i. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

ii. By unit prices state in the Contract Documents or subsequently agreed upon;

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

iv. By the method provided under Article 2.26.

E. The amount of credit to be allowed by the Contractor to the Owner, as confirmed by the Project Manager, for any deletion or change that results in a decrease in the Contract Sum will be the amount of the actual cost. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

2.26 CHANGES TO THE CONTRACT (EXTRA WORK AT FORCE ACCOUNT)

A. If none of the methods set forth in Section 2.25.D, is agreed upon, the Contractor, provided that a written order signed by the Owner is received, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Project Manager, on the basis of reasonable expenditures or savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, not more than twenty percent (20%) for all overhead and profit. In such case, and also under Section 2.25.D, Paragraph 3, the Contractor shall keep and present, in such form as the Owner or the Project Manager may prescribe, an itemized accounting of actual cost together with appropriate supporting data for inclusion in a Contract Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following:

1. Labor Cost is the cost of labor for the workers (including working foremen) used in the actual and direct performance of the extra work, whether employed by the Contractor, or Subcontractors and Specialized Forces of any tier. Labor Cost shall include:

   a. Actual Wages paid to the works, plus employer payments to or on behalf of the workers for health and welfare, pension, vacation, and training. If required by the Project Manager, certified payrolls shall be submitted with extra work reports as verification of wages paid to the workers.

   b. A Labor Surcharge of twenty percent (20%) (thirty five percent (35%) for demolition work and roofing work) will be added to the Actual Wages as defined above. The Labor Surcharge shall constitute full compensation for all payments imposed by State and Federal laws, including Workers Compensation Insurance, Social Security, and Unemployment Insurance.

   c. Subsistence and Travel Allowance if actually paid to the workers. Labor Surcharge will not be added to Subsistence and Travel Allowance.

2. Equipment Cost is the payment made for the equipment actually used in the performance of the extra work.

   a. Equipment valued at three hundred dollars ($300) or less shall be considered as small tools, and no payment will be made therefor.

   b. Equipment costs will be paid in accordance with the rental rates listed in the “Cal-Trans Equipment Rental Rates, County of Fresno, Department of Public Works and Planning,” in effect at the time of bid, available from the Department, Suite 711, Fresno County Plaza Building, 2220 Tulare Street, Fresno, CA 93721.

c. In the event that any of the equipment to be used is not listed in the above publication, the rental rate shall be agreed upon in writing by the Contractor and CM before the extra work is begun.

3. Materials Cost is the payment made for materials incorporated into the Work.

   a. Materials Cost shall include sales tax, freight, and delivery charges, less any available discounts whether or not said discounts are taken.

   b. Materials Cost shall be based upon supplier's or manufacturer's invoice. If invoices or other satisfactory evidence of cost are not furnished within sixty (60) days of delivery or within fifteen (15) days after acceptance of the Contract, whichever occurs first, then the Project Manager shall determine the Materials Cost, in his/her sole discretion, on the basis of available information and on his/her considered experience.

4. Specialized Services are those services or items of extra work that, by agreement of the Contractor and the Project Manager, cannot be performed by forces of the Contractor of his/her Subcontractors, and may be performed by a specialist.

   a. Specialized Services may be paid for by invoice if the established practice of the specialized force industry does not provide complete itemization of Labor, Equipment, and Materials Costs.

5. Markup for Profit, Home Office and Field Office Overhead, Bond Premium, insurance, taxes, and supervision will be added to the total of Labor Cost, Equipment Cost, Materials Cost, and Specialized Services.

   a. Markup will be added only once on any Extra Work at Force Account, regardless of the number of contractors and subcontractors involved.

   b. It is recognized that individual contractors and subcontractors have different overhead costs, profit requirements, and bond premium rates. The amount to be added to Extra Work for markup shall include compensation for profit, overhead and bond premium without distinguishing among these items.

   c. The markup to be added for Extra Work at Force Account on this Project shall be fifteen percent (15%) plus 1-1/2% for Performance and Payment Bonds for Contractor only.

6. Records shall be maintained by the Contractor and Subcontractors in such a manner as to provide a clear distinction between the costs of Extra Work paid for on a forced account basis and the costs of other operations. From these records, the Contractor shall furnish the Project Manager a completed extra work report for each day's extra work to be paid for on a force account basis. Extra work reports shall itemize the materials used, equipment rental charges, and specialized services costs, and shall provide names or identifications and classifications of workmen, the hourly rate of pay, and hours worked. Extra work reports shall be compiled and submitted to the Project Manager daily for verification and signature. Extra work reports shall be signed by the Contractor or his/her authorized representative.

7. If the Contractor disputes the Architect's cost determination, the Contractor may initiate a claim in compliance with the Claims and Disputes Resolution provisions of these General Conditions.

2.27 SITE CONDITIONS

A. Where investigations have been conducted by the Owner of existing conditions on a site, including subsurface conditions, such investigations are made for the purpose of design only and for the information of bidders. The results of such investigations represent only the statement by the Owner as to the circumstance and character of materials actually encountered by the Owner during the investigations. The Owner makes no guarantee or warranty, express or implied, that the conditions indicated are representative of conditions existing throughout the site of a Project or any part of it, or that unanticipated conditions might not occur.

B. All excavation work shall be performed on an "unclassified basis"; that is, such work shall include the removal of all material encountered including earth or rock formations, regardless of the type or hardness thereof, or groundwater conditions in the excavation, the cost of such excavations being included in the Contract Sum. Unclassified excavation Work includes drilling or blasting operations.

C. If site conditions are discovered that materially differ from previous information that the Contractor has received, and that could not have been discovered by the Contractor through prudent and reasonable investigation prior to developing the Contract Sum for the Work, the Contractor shall be compensated for additional costs incurred in working with the unknown site conditions, but only to the extent that such previously unknown and undiscoverable site conditions cause the Contractor to incur costs in addition to the Contract Sum for that portion of the Work. The Contractor must be able to demonstrate clearly the original Contract Sum for that portion of the Work (plus any Contract Change Orders applicable to that portion of the Work) and the additional costs incurred as a direct result of the unknown site conditions. Only additional costs over and above the amount of the Contract Sum for that portion of the Work will be compensated upon a recommendation of approval by the Project Manager.

2.28 REQUEST FOR EQUITABLE ADJUSTMENT

A. If the Contractor considers a Request for Equitable Adjustment is justified for any increase in the contract time, the Contractor shall promptly, upon first observance of the condition giving rise to the request, provide the Project Manager and Owner written notice of such condition and circumstance. This notice shall be given by the Contractor before proceeding to execute the Work, except in emergency endangering life or property, in which case the Contractor shall proceed in accordance with the Emergency provisions of these General Conditions. No such request shall be valid unless so made. A Contract Change Order shall be required to authorize any change in the contract time resulting from such request for equitable adjustment.

B. If the Contractor requests that additional cost or time is involved because of, but not limited to, (1) any written interpretation pursuant to Section 2.07.G, (2) any order by the Owner to stop the Work pursuant to Section 2.08 where the Contractor was not at fault, or any such order by the Project Manager as the Owner's agent, (3) any written order for a minor change in the Work issued pursuant to Section 2.29, the Contractor shall make such request for equitable adjustment as provided in Section 2.28.A.

2.29 MINOR CHANGES IN THE WORK

The Project Manager will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or extension of the contract time and not inconsistent with the intent of the Contract Documents. Such changes shall be enacted by written order issued through the Project Manager, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

2.30 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 the partners, successors, assigns, and legal representatives of such other party with respect to all covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other.

2.31 ASSIGNMENT OF MONEYS

The Contractor shall not assign moneys due or to become due him/her under the contract without the written consent of the Auditor-Controller of Fresno County. Any assignment of moneys shall be subject to all proper set-offs in favor of the County of Fresno and to all deductions provided for in the contract and particularly all money withheld, whether assigned or not, shall be subject to being used by the County of Fresno for the completion of the work in the event that the Contractor should be in default therein.

2.32 GUARANTEE OF WORK

A. The Contractor warrants to the Owner that all materials and equipment and the Work as a whole furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects, and in conformance with the Contract Documents, for a period of 365 Calendar Days from the date of acceptance of the Work as specified in the Notice of Completion, unless a longer period is otherwise specified. All manufacturer's warranties required by the Contract Documents shall commence on the date of the filing of the Notice of Completion for the Work (which date necessarily will follow the performance under separate contracts). It shall be the Contractor's responsibility, through appropriate contractual arrangements with all subcontractors, materialmen, and suppliers, to ensure compliance with this requirement. All Work not conforming to these requirements, including substitutions not properly reviewed and authorized, may be considered defective. If required by the Project Manager, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

B. If repairs or changes are required in connection with guaranteed work within any guaranteed period, which, in the opinion of the Project Manager is rendered necessary as the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the Contract Documents, the Contractor shall, promptly upon receipt of notice from the Owner, and without expense to the Owner, (1) place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein; and (2) make good all damage to the building or site, or equipment or contents thereof, which, in the opinion of the Project Manager, is the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the Contract Documents; and (3) make good any work or materials, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

C. If the Contractor disturbs any work guaranteed under another contract in fulfilling the requirements of the contract or of any guarantee, embraced in or required thereby, he/she shall restore such disturbed work to a condition satisfactory to the Project Manager and guarantee such restored work to the same extent as it was guaranteed under such other contract.

D. The Owner may have the defects corrected if the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee and the Contractor and his/her surety shall be liable for all costs and expenses incurred in connection therewith.

E. All special guarantees applicable to definite parts of the work that may be stipulated in the Contract Documents shall be subject to the terms of this Article 2.32 during the first (1st) year (365 Calendar Days) of the life of such special guarantee.

2.33 RESPONSIBILITY FOR DAMAGE

A. Neither the Owner, the Architect, nor any officer or employee of the County, or officer or employee thereof, within the limits of which the work is being performed, shall be answerable or accountable in any manner, for any loss or damage that may happen to the work or any part thereof; or for any of the materials or other things used or employed in performing the work; or for injury to any person or persons, either workmen or the public, for damage to property from any cause which might have been prevented by the Contractor, or his/her workmen, or anyone employed by him/her, against all of which injuries or damages to persons and property the Contractor having control over such work must properly guard.

B. The Contractor shall be responsible for any liability imposed by law for any damage to any person or property resulting from defects or obstructions or from any cause whatsoever during the progress of the work or at any time before the issuance of the Notice of Completion.

C. The Contractor shall indemnify and hold harmless the Owner, the Project Manager, the Architect, and all of their respective officers and employees, from all claims, lawsuits or actions of every kind and nature whatsoever, brought for, or on account of any injuries or damages received or sustained by any person or persons, resulting from any act or admission by the Contractor or his/her servants or agents, in the construction of the work or by or in consequence of any negligence in guarding the same, in improper materials used in its construction, or by or on account of any act or omission of the Contractor or his/her agents in the performance of Contractor's obligations under the Contract Documents. In addition to any remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall be considered necessary by the Owner may be retained by the Owner until disposition has been made of such claims, lawsuits, or actions for damages as aforesaid.

2.34 WRITTEN NOTICE

Subject to any additional requirements that may be applicable to claims under the immediately following Article 2.35 RESOLUTION OF CONTRACT CLAIMS AND DISPUTES, formal service, when required, of written notice shall be deemed to have been duly served if delivered in person, to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if sent by registered or certified mail to the listed address of that entity for the attention of such individual.

2.35 RESOLUTION OF CONTRACT CLAIMS AND DISPUTES

A. A Claim is a demand or assertion, sent by registered mail or certified mail with return receipt, requested by one (1) of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time, or a request for equitable adjustment or Contract Change Order which cannot be resolved per provisions of Section 2.25 - CHANGES TO THE WORK. Any Claim shall be reduced to writing and filed with the Project Manager, within ten (10) calendar days after the Contractor has notice of the condition giving rise to the Claim, and final action per Section 2.25 - CHANGES TO THE WORK procedures has taken place or has been declared as such in writing, by either party. Such ten (10)-day notice of an asserted claim is in addition to the requirement for prompt notice required per Section 2.25 - CHANGES TO THE WORK.

B. The Contractor shall not claim or recover any overhead cost administrative or otherwise, particularly 'Home Office' expenses, 'Extended site overhead', or any other overhead cost on the basis of any 'Home Office' damages formula, 'Eichleay' formula, 'Total Cost' recovery formula or any other such formula.

C. REQUIREMENTS FOR FILING A CLAIM. Claims shall be submitted to the Project Manager. Claims must be filed within the time specified above, but in no event shall any claim be considered by the Project Manager that is filed later than the date of final payment of the Project. The claim shall be in writing and shall be a sum certain, if known. If unknown, Contractor shall specify the basis for establishing the sum certain. Claim shall include a statement of the reasons for the asserted entitlement and include the documents necessary to substantiate the claim. Such documents may include, but are not limited to, payroll records, purchase orders, quotations, invoices, estimates, subcontracts, daily logs, supplier contracts, subcontract billings, bid takeoffs, equipment rental invoices, ledgers, journals, daily reports, job diaries, and any documentation related to the requirements of Section 2.25 - CHANGES TO THE WORK. In the case of a continuing delay, only one (1) claim is necessary. If adverse weather conditions are the basis for a claim for additional time, such claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the critical activities on the construction schedule. The Contractor shall certify, at the time of submission of a claim, as follows:

"I, _____, being the _____ (MUST BE AN OFFICER) of _____ (GENERAL CONTRACTOR), declare under penalty of perjury under the laws of the State of California, and do personally certify and attest that: I have thoroughly reviewed the attached claim for additional compensation and/or extension of time, and know its contents, and said claim is made in good faith; the supporting data is truthful and accurate; the amount requested accurately reflects the contract adjustment for which the Contractor believes the Owner is liable; and, further, that I am familiar with California Penal Code Section 72 and California Government Code Section 12560, et seq, pertaining to false claims, and further know and understand that submission or certification of a false claim may lead to fines, imprisonment and/or other severe legal consequences."

By: _____ _____
(Contractor's signature) (Date)

D. Nothing in this Article is intended to extend the time limit or supersede notice requirements otherwise provided by this contract or by applicable law for the filing of claims. Any formal claim shall be processed in accordance with the provisions of Public Contract Code Section 9204 and Section 20104 et. seq., each of which establishes a process for resolution of claims, the provisions of which are consistent with and effectively summarized by the following:

1. The Owner (or his/her designee), shall review the facts pertinent to the claim, obtain additional information deemed necessary for a decision (if any), review recommendations of the Project Manager, coordinate with the contract administrator (if any), and secure assistance from legal and other advisors, and render a written decision on the claim within forty-five (45) days of receipt of the claim. If additional information or documentation is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner (or his/her designee) and claimant. The Owner's (or his/her designee's) written response to the claim, as supplemented by any additional information and/or documentation provided by claimant, shall be submitted to the claimant within fifteen (15) days after receipt of the further information and/or documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

    a. For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the Owner (or his/her designee), shall respond in writing to all written claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the Owner (or his/her designees) may have against the claimant.

2. If the claimant disputes the written response of Owner (or his/her designee), or Owner fails to respond within the time prescribed, the claimant may so notify the Owner (or his/her designee), in writing, either within fifteen (15) days of receipt of the Owner (or his/her designee's) response or within fifteen (15) days of the Owner (or his/her designee'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 demand, the Owner (or his/her designee) shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

3. Within ten (10) business days following conclusion of the meet and confer conference, any unpaid portion of the claim remaining in dispute shall be submitted to nonbinding mediation, as that term is defined by Public Contract Code Section 9204(d)(2)(C).

4. If following the conclusion of the meet and confer conference and mediation process, the claim or any portion thereof remains in dispute, the claimant may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his/her written claim pursuant to subdivision (a) until the time the claim is denied, including any period of time utilized by the meet and confer conference and mediation process as described in the immediately preceding Paragraphs 2 and 3 of this Section D.

5. In the event of any perceived conflict between the summary of the procedure set forth in this Article and the actual provisions of the Public Contract Code Section 9204 and Section 20104, et seq., the statutory provisions shall control; and in the event of any perceived conflict between the provisions of Section 9204 and Section 20104, et seq., the provisions of Section 9204 shall control.

E. PROCEDURES FOR CIVIL ACTIONS TO RESOLVE DISPUTED CLAIMS. Non-binding Mediation: Within sixty (60) days, but no earlier than thirty (30) days, following the filing of a responsive pleading, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation by both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause shown to the court. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

Judicial Arbitration: If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of the code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this

subsection consistent with the rules pertaining to judicial arbitration. Arbitrators shall be experienced in construction law.

Appeals: As provided by statute (specifically Public Contract Code section 20104.4(b)(3) and Code of Civil Procedure section 1141.21), any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees, also pay the attorneys' fees on appeal of the other party.

F. CLAIMS AND DISPUTES EXEMPT FROM FILING REQUIREMENTS. The requirements and procedures imposed by this Article do not apply to:

1. Any claims by the Owner; or

2. Any claim for or respecting personal injury or death or reimbursement or other compensation arising out of or resulting from liability for personal injury or death; or

3. Any claim or dispute relating to stop payment requests or stop notices; or

4. Any claim or dispute related to the approval, refusal to approve, or substitution of Subcontractors, regardless of tier, and suppliers.

G. PAYMENT OF UNDISPUTED PORTION OF CLAIM. Owner shall pay claimant such portion of a claim that is undisputed except as otherwise provided in the contract.

H. CONTINUE WORK DURING DISPUTE. In the event of any disputed claim or other dispute between the Owner and the Contractor, the Contractor will not stop work but will prosecute the work diligently to completion in his/her manner directed by the Owner, and the dispute shall be resolved by a court of law after completion of the Work. However, Contractor must submit all disputes in accordance with the provisions of this Section 2.35.

I. SUIT IN FRESNO COUNTY ONLY. Any litigation arising out of this Contract shall be brought in Fresno County and Contractor hereby waives the removal provisions of California Code of Civil Procedure Section 394.

2.36 PERFORMANCE BOND, LABOR AND MATERIAL PAYMENT BOND, AND WARRANTY BOND

A. The Contractor shall furnish Performance Bond in the amount of one hundred percent (100%) of the Contract Sum, and Payment Bond in the amount of one hundred percent (100%) of the Contract Sum and One Year Warranty Bond in the amount of ten percent (10%) of the Final Contract Sum, which is the cumulative amount that will have been paid to Contractor for all of the Work performed under the Contract once the Project has been completed and the Work has been accepted by the County.

B. All bonds required, whether Bid bonds, Performance, Payment, Warranty, or other bonds, shall be issued by an admitted surety insurer authorized by the California Insurance Commissioner to transact surety insurance in the state. The same admitted surety insurer must issue the Bid Bond, Performance Bond, Payment Bond, and Warranty Bond. The payment, performance, and warranty bonds required by these specifications will neither be accepted nor approved by the Owner unless the bonds are underwritten by an admitted surety and the requirements of California Code of Civil Procedure section 995.630 are met. The bonds must include a physical mailing address, phone number, and contract person for the admitted surety insurer. The Owner further reserves the right to satisfy itself as to the acceptability of the surety and the form of bond. Upon request of the Owner, the bidder must submit the following documents:

1. The original, or a certified copy, of the unrevoked appointment, power of attorney, bylaws, or other instrument authorizing the person who executed the bond to do so.

2. A certified copy of the certificate of authority of the insurer issued by the California Insurance Commissioner.

3. A certificate from the county clerk that the certificate of authority has not been surrendered, revoked, canceled, annulled, or suspended, or in the event that it has, that renewed authority has been granted.

4. A financial statement of the assets and liabilities of the insurer to the end of the quarter calendar year prior to thirty (30) days next preceding the date of the execution of the bond, in the form of an officers' certificate as defined in Corporations Code section 173.

2.37 RIGHTS AND REMEDIES

A. The duties and obligations imposed by the Contract Documents and the rights and remedies available hereunder shall be in addition to, and not a limitation of, any duties, obligations, rights, and remedies otherwise imposed or available by law.

B. No action or failure to act by the Owner, or by the Project Manager or Architect, regarding any deficiency, breach, or default in performance by the Contractor under the Contract Documents, shall be deemed or construed to constitute acquiescence of the Owner in connection therewith or with regard to any subsequent deficiency, breach, or default in performance by the Contractor; nor shall any such prior act of failure to act by or on behalf of Owner be deemed or construed as a waiver of any rights in favor of Owner regarding any such deficiency, breach, or default in performance by the Contractor, regardless of the similarity to the prior incident or circumstance when no action was taken regarding any alleged deficiency, breach, or default in performance by the Contractor.

2.38 TIME, DELAYS, AND LIQUIDATED DAMAGES

A. DEFINITIONS

1. Unless otherwise provided, the contract time is the period of time allotted in the Contract Documents for completion of the Work, including authorized adjustments thereto.

2. The Date of Commencement of the Work is the date established in the Notice to Proceed.

3. The Date of Completion of the Work is the date on which the work is certified as complete by the Project Manager as specified in the Notice of Completion.

4. The term “day” as used in the Contract Documents shall mean calendar day unless specifically designated otherwise.

B. PROGRESS AND COMPLETION

1. Time is of the essence regarding all time limits stated in the Contract Documents. By executing the Agreement, the Contractor confirms that the contract time is a reasonable period for performing the Work.

2. The Contractor shall begin the Work on the Date of Commencement. The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required herein to be furnished by the Contractor. The Date of Commencement of the Work shall not be changed by the effective date of such insurance.

3. The Contractor shall carry the Work forward expeditiously with adequate forces and shall achieve Completion of the Work within the contract time.

C. DELAYS AND EXTENSIONS OF TIME

1. Delays in prosecution of parts or classes of the Work that are not demonstrated to prevent or delay completion of the entire Project or specific milestones within the contract time are not "unavoidable delays" for purposes of this section.

2. In all cases, the time authorized for extension of the contract time shall be no greater than the number of days directly attributable to the event or circumstances which causes unavoidable delay in the completion of the Project. Contractor shall be entitled, in the case of unavoidable delays, to an extension in the contract time, but not to any increase to the Contract Sum. "Unavoidable delay" for this purpose shall be defined as follows:

a. Unavailable Materials. That materials or articles called for in the Contract Documents are not obtainable within the time required for timely completion; provided that such materials or articles were listed by the Contractor in the schedule required by Section 2.17 - CONTRACTOR'S CONSTRUCTION SCHEDULE; that the Contractor demonstrates that the unavailability of the materials is in fact the cause for the delay, and could not have been avoided by an appropriate adjustment in the Construction Schedule; and that the unavailability of such materials is due to circumstances beyond the Contractor's control. If good cause for delay is demonstrated pursuant to this subsection, the Owner, at its sole discretion, may grant a time extension.

b. Force Majeure. That delays in construction have resulted from circumstances beyond the control of the Contractor and which the Contractor could not have provided against by the exercise of reasonable care, prudence, foresight, and diligence. Unavoidable delays within the meaning of this subparagraph shall be those caused by acts of God, war, insurrection, civil disorder, fire, floods, epidemic, or strikes.

c. Unseasonable Weather. An extension of contract time may be granted due to weather which is unsuitable for the Work currently in progress, upon the determination of the Owner that the weather conditions in fact caused the delay in completion of the Project and that such weather conditions were not, and could not in the exercise of reasonable diligence, have been foreseen by the Contractor. Seasonable weather that, in the exercise of reasonable foresight and diligence, should be expected in the area at the time of year in question is not cause for an extension of time.

d. Time Extensions Due to Contract Change Orders or Work Authorizations. A time extension may be granted due to additional work that results in a delay in the Project caused by the approval by the Owner of a Contract Change Order or Work Authorization. The Contractor shall be entitled to a contract time extension Change Order only when the extra Work is demonstrated by the Contractor to have caused a delay in the Project.

e. Owner-Caused Delays. In the event that the Project is delayed by acts of the Owner not authorized by the Contract Documents which the Contractor demonstrates will or have caused an unavoidable delay, the Contractor shall be entitled to a contract time Change Order to offset the extra time incurred by the Contractor. The Contractor will not be entitled to adjustments in the Contract Sum. Extra time shall be limited to that which is directly identified as critical by the delay.

4. The Contractor specifically agrees that a time extension as provided herein is its sole remedy for Owner-caused delays, and agrees to make no claim or demand for additional damages, nor claim an acceleration of the time for performance.

5. The Contractor shall not be entitled to any contract time extension nor Contract Sum adjustment for alleged Owner delays if the Owner has acted within the time limits specified by the Contract Documents.

D. NOTICE OF DELAYS

1. Contractor shall notify the Project Manager promptly whenever the Contractor foresees any event or circumstance that may delay the prosecution of the Work and in Contractor's opinion may provide grounds for an extension, and shall in any event notify the Project Manager immediately upon the occurrence of any such delay. The Contractor shall take immediate steps to prevent, if possible, the occurrence or continuance of the delay. If this cannot be done, the Project Manager shall determine how long the delay shall continue and to what extent the prosecution and completion of the Work are being delayed thereby. Such notification shall specify with detail the cause asserted by the Contractor to constitute grounds for an extension. Failure of the Contractor to submit such a notice within ten (10) days after the initial occurrence of the event giving rise to the delay shall constitute a waiver by the Contractor of any request for a time extension, and no extension shall be granted as a consequence of such delay.

2. If the Contractor believes that the delay in prosecution in the Work will result in an unavoidable delay in completion of the entire Project, the Contractor shall submit evidence to support that belief, together with its request for a time extension. Such evidence shall include a demonstration that the delayed portion of the Work will affect the Critical Path Scheduling of the entire Project. The Contractor shall also submit a proposed revised Construction Schedule, which accounts for the delay in completion of the entire Project caused by the delay in prosecution of part of the Project, and includes a revised Critical Path demonstrating how the Project will be completed within the proposed revised contract time.

E. INVESTIGATION; PROCEDURE

1. Upon receipt of a request for Time extension, the Project Manager shall conduct an investigation of the facts asserted by the Contractor to constitute grounds for an extension. The results of this investigation shall be reported by the Project Manager to the Contractor and shall indicate whether he/she will recommend for or against such extension to the Owner. The performance of this investigation by the Project Manager shall not be construed as direction or recommendation to the Contractor regarding scheduling of the work. Scheduling this work is the sole responsibility of the Contractor.

2. The Project Manager may, in his/her sole discretion, defer this recommendation to allow the accumulation of time extensions due to Work Authorizations into a periodic or final Contract Change Order request.

3. Upon receiving the Project Manager's recommendation to the Owner regarding the Contractor's request for a time extension, the Contractor may either withdraw its application for extension, or request that it be scheduled for action by the Owner. If the Owner disallows the request, there shall be no allowance made for the time during which the request was pending, and the Contractor shall remain obligated to complete the Work in the time specified.

4. If the Owner approves the time extension Contract Change Order, the new Construction Schedule submitted by the Contractor and approved by the Owner shall be deemed to amend the original Construction Schedule approved by the Owner; thereafter, the amended Construction Schedule shall have the same force and effect as the originally approved Progress Schedule.

5. The revised Construction Schedule must be submitted within seven (7) calendar days of the date on which the Owner approves the change.

6. The Contractor agrees that the Owner’s determination as to the existence of grounds for an extension, and the duration of any such extension, shall be final and binding upon both Owner and Contractor.

F. DISCRETIONARY TIME EXTENSION FOR BEST INTEREST OF OWNER

1. The Owner reserves the right to extend the contract time for completion of the Work if the Director of Public Works and Planning or designee determines that such extension is in the best interest of the Owner.

2. In the event that such discretionary extension is made at the request of the Contractor, the Owner shall have the right to charge to the Contractor all or any part, as the Board may deem proper, of the actual cost to the Owner for engineering, inspection, supervision, contract administration, incidental, and other overhead expenses that accrue during the period of such extension, and to deduct all or any portion of such amounts from the final payment for the Work.

3. In the event such extension is ordered over the objection of the Contractor, the Contractor shall be entitled to a Contract Change Order adjusting the price paid to reflect the actual costs incurred by the Contractor as a direct and proximate result of the delay, upon his/her written application therefor, accompanied by such verification of costs as the Project Manager requires. Only additional direct costs incurred at the site will be reimbursable by Contract Change Order.

G. LIQUIDATED DAMAGES

1. If the Work is not completed by Contractor in the time specified in the Work Order, or within any period of extension authorized pursuant to this Article, the Contractor acknowledges and admits that the Owner will suffer damage, and that it is impracticable and infeasible to fix the amount of actual damages. Therefore, it is agreed by and between the Contractor and the Owner that the Contractor shall pay to the Owner as fixed and liquidated damages, and not as a penalty, the sum specified in Section 005213, Agreement, Article III for each calendar day of delay until the Work is completed and accepted, and that both the Contractor and the Contractor's surety shall be liable for the total amount thereof, and that the Owner may deduct said sums from any monies due or that may become due to the Contractor.

2. This liquidated damages provision shall apply to all delays of any nature whatsoever, save and except only unavoidable delays approved by the Owner pursuant to the provisions of Article 2.38.C.2 hereinabove, or discretionary time extensions approved by the Board of Supervisors pursuant to the provisions of Article 2.38.F hereinabove.

H. EXTENSION OF TIME NOT A WAIVER

1. Any extension of contract time granted pursuant to this Article shall not constitute a waiver by the Owner, nor a release of the Contractor, from his/her obligations to perform the Work within the allotted contract time.

2. Granting of a time extension due to one (1) circumstance on one (1) request therefore shall not constitute a granting by the Owner of an extension of time for any other circumstance or the same circumstance occurring at some other time, and shall not be interpreted as a precedent for any other request for extension.

2.39 PROTECTION OF PERSONS AND PROPERTY

A. SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.

B. SAFETY OF PERSONS AND PROPERTY

The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

1. All employees on the Work and all other persons who may be affected thereby;

2. All the work and all materials and equipment to be incorporated therein, whether in storage or off the site, and that is under the care, custody, or control of the Contractor or any of the Contractor's Subcontractors or Sub-subcontractors;

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and

4. The work of the Owner or other separate contractors.

C. The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

D. The Contractor shall erect and maintain, as required by existing conditions and the progress of the Work, all 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 facilities.

E. When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

F. The Contractor shall promptly remedy all damage or loss to any property referred to above caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, and for which the Contractor is responsible under the above noted clauses, except damage or loss attributable solely to the acts or omissions of the Owner, the Project Manager, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable in any degree to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under the Indemnification provisions provided herein.

G. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and the Project Manager.

H. The Contractor shall not load or permit any part of the Work to be loaded in a manner that could endanger its safety or pose a risk to anyone working at the Project site.

I. EMERGENCIES
In any emergency affecting the safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in the provisions herein for Changes in the Work.

2.40 INSURANCE

A. CONTRACTOR'S INSURANCE

1. Bidders' attention is directed to the insurance requirements below. It is highly recommended that Bidders confer with their respective insurance carriers or brokers to determine in advance of bid submission the availability of the insurance certificates and endorsements required below. A bidder who is awarded a contract and thereafter fails to comply strictly with the insurance requirements, will be deemed to be in default of its obligations.

2. Contractor shall procure and maintain for the duration of the Contract, and for three (3) years thereafter, insurance against claims for injuries to persons or damages to property which may arise from, or in connection with, the performance of the work hereunder by the Contractor, his agents, representatives, employees, or subcontractors. The cost of such insurance shall be included in the Contractor's bid.

3. No later than ten (10) calendar days following the Award of the Contract, and prior to execution of the Agreement for Construction by the Owner, the Contractor shall submit certificates of insurance, signed by an authorized agent of the insurer, attesting to insurance coverage of the Contractor as required by this Article.

B. MINIMUM SCOPE AND LIMITS OF INSURANCE

Coverage shall be at least as broad as:

1. Commercial General Liability (CGL): Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products and completed operations, property damage, bodily injury, and personal & advertising injury with limits no less than five million dollars ($5,000,000) per occurrence and an annual aggregate of ten million dollars ($10,000,000). If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be three times the required occurrence limit.

2. Automobile Liability: Insurance Services Office (ISO) Form CA 0001 covering Code 1 (any auto), with limits no less than five million dollars ($5,000,000) per accident for bodily injury and property damage. Coverage should include owned and non-owned vehicles used in connection with this Agreement and all applicable endorsements.

3. Workers' Compensation insurance as required by the State of California, with Statutory Limits, and Employers' Liability insurance with a limit of no less than one million dollars ($1,000,000) per accident for bodily injury or disease.

4. If Contractor is a licensed professional or employs professional staff, (e.g., Architect, Engineer, Surveyor, etc.) in providing services, Professional Liability with limits no less than $2,000,000 per occurrence or claim, and $3,000,000 annual aggregate.

5. Builder's Risk (Course of Construction) insurance utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions.

If Contractor maintains broader coverage and/or higher limits than the minimums shown above, the Owner requires and shall be entitled to the broader coverage and/or the higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Owner.

Self-Insured Retentions

Self-insured retentions must be declared to and approved by the Owner. At the option of the Owner, either: the Contractor shall obtain coverage to reduce or eliminate such self-insured retentions as respects the Owner, its officers, officials, employees, and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the Owner guaranteeing payment of losses and related investigations, claim administration, and defense expenses. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or Owner.

C. OTHER INSURANCE PROVISIONS

Contractor's insurance policies are to contain, or be endorsed to contain, the following provisions:

1. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees, or volunteers.

2. The County of Fresno, its officers, officials, employees, and volunteers are to be named individually and collectively, as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees, or volunteers.

3. The insurer shall agree to waive all rights of subrogation against the Owner, its officers, officials, employees, and volunteers for losses arising from work performed by the Contractor for the Owner.

4. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the Owner, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the Owner, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

5. Any failure to comply with reporting provisions of the policies shall not affect Coverage provided to the Owner, its officers, officials, employees, agents, Engineers, Consulting Engineers, or volunteers.

6. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

7. All Contractor's insurance policies for coverage required under this agreement shall not be cancelled or changed, such as a reduction in coverage, without a minimum of thirty (30) days advance written notice given to Owner.

8. The insurer shall agree to waive all rights of subrogation against the Owner, its officers, officials, employees, and volunteers for losses arising from work performed by the Contractor for the Owner.

9. The Builder's Risk (Course of Construction) policy shall be an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions. All subcontractors shall be insured to the extent of their portion of the work under the Contractor. The Contractor shall request, and is responsible to confirm with its insurer, that the County of Fresno and all subcontractors are named, both as additional insured and as additional loss payees, on the Builder's Risk insurance policy. The Contractor and all subcontractors waive all rights, each against the others, for damages arising from perils covered by the insurance required under the terms of this article, except such rights as they may have to the proceeds of the Builder's Risk insurance obtained and maintained by the Contractor.

D. ACCEPTABILITY OF INSURERS

Contractor shall obtain the policies and coverages specified herein from an admitted insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and having a Best's rating of no less than A FSC VIII.

E. SUBCONTRACTORS

Contractor shall include all Subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each Subcontractor.

F. EVIDENCE OF COVERAGE

Within ten (10) days of bid award, Contractor shall furnish the Owner with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this Article 2.40) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to Owner. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. The Owner reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

Certificates of Insurance and Endorsements for all policies must be signed by a person authorized by the insurer to bind coverage on its behalf, indicate the name and address of the official who will administer this contract, state that such insurance coverages have been obtained and are in full force and effect, and clearly indicate that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice has been given to the Owner.

Commercial General Liability Endorsements must name the County of Fresno, its officers, agents and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned; that such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by Owner, its officers, agents and employees, shall be excess only and not contributing with insurance provided under Contractor's policies herein.

2.41 UNCOVERING WORK

A. This Section shall apply to any Work installed and covered up by the Contractor that is required by the Building Code or other statutory or regulatory requirement to undergo inspection or special inspection and/or testing approval by an appropriate official representing the Owner or other public authority having jurisdiction to conduct such inspection and/or testing. Work covered up by the Contractor, Contractor's Subcontractors, or Suppliers prior to inspection/special inspection and/or testing approval shall be uncovered and repaired or replaced after inspection approval at the sole expense of the Contractor. This shall apply to all labor and material needed to complete both physical and cosmetic repairs, and any additional inspection costs associated with restoring the Work.

B. This Section also shall apply to any Work installed and covered up by the Contractor, Contractor's Subcontractors, or Suppliers that is determined by the Owner or its Project Manager, during construction or within the Warranty period, to be defective, broken, or inoperative. Work covered up by the Contractor, Contractor's Subcontractors, or Suppliers that is found to be defective, broken, or inoperative shall be uncovered and repaired or replaced at the sole expense of the Contractor. This shall apply to all labor and material needed to complete both physical and cosmetic repairs, and any additional inspection costs associated with restoring the Work.

2.42 CORRECTION OF WORK

A. The Contractor shall promptly correct all Work rejected by the Project Manager as defective or as failing to conform to the Contract Documents, whether or not fabricated, installed, or completed. The Contractor shall submit a plan of action, within twenty-four (24) hours of notification of the rejected work by the Project Manager, for correcting the rejected work. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the additional architectural and/or engineering services made necessary thereby.

B. If, within 365 Calendar Days after the date of acceptance of the Work as specified in the Notice of Completion, or designated portion thereof, or within 365 Calendar Days after acceptance by the Owner of designated equipment, or within such longer period of time as may be prescribed by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found by Owner to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. This obligation shall survive both final payment for the Work or designated portion thereof and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

C. The Contractor shall, at his/her sole expense, remove from the site all portions of the Work that are defective or nonconforming and which have not been corrected under Articles 2.32, 2.42.A, and 2.42.B, unless the Owner waives removal.

D. If the Contractor fails to submit a plan of action, within twenty-four (24) hours of notification of the rejected work by the Project Manager, for correcting the rejected work, or fails to correct defective or nonconforming Work as provided herein in Articles 2.32, 2.42.A, and 2.42.B, the Owner may correct it in accordance with Article 2.08.C.

E. If the Contractor does not take action under the plan to initiate such correction of such defective or nonconforming Work within ten (10) days of written notice from the Project Manager, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, the Owner may, upon ten (10) additional days' written notice, sell such Work at auction or at private sale and shall account for the proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Project Manager, Architect, or other Professional's additional services made necessary thereby. If such proceeds of sale do not cover all costs that the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Supplemental Work Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

F. The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

G. Nothing contained in this Section 2.42 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Section 2.32 hereof. The establishment of the time periods noted in this Section 2.42, or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the defective or nonconforming Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the defective or nonconforming Work.

2.43 ACCEPTANCE OF DEFECTIVE OR NONCONFORMING WORK

If the Owner prefers to accept defective or nonconforming Work, the Owner may do so instead of requiring its removal and correction, in which case a Contract Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be given effect whether or not final payment has been made. The Project Manager shall determine the amount of reduction in the Contract Sum.

2.44 TERMINATION BY THE OWNER

A. If the Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of the Contractor's insolvency, or stop notices are served upon the Owner, or if the Contractor persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards applicable laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, and fails after written notice to commence and continue correction of such default, neglect, or violation with diligence and promptness, the Owner upon certification by the Project Manager that sufficient cause exists to justify such action, may, after an additional written notice and without prejudice to any other remedy the Owner may have, terminate the Contract and take possession of all materials, equipment, tools, construction equipment, and machinery thereon owned by the Contractor and may finish the Work by whatever methods the Owner may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished.

B. If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the Project Manager's and Architect's additional services made necessary thereby, Contractor will only be paid for his/her actual unpaid costs from such excess. If such costs exceed the unpaid balance, the contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Project Manager, upon application, in the manner provided in Section 2.24 and this obligation for payment shall survive the termination of the Contract.

2.45 SUBSTITUTION OF MATERIALS

A. When a specific manufacturer, trade name, or material is specified, or indicated, it is to establish a standard of quality and shall not be construed as limiting competition. The intent of the Contract Documents is to specify high-grade standard material and equipment, and it is not the intent of these Contract Documents to exclude or omit the products of any responsible manufacturer, if such products are equally acceptable in terms of quality, finish, performance, durability, and serviceability, in the judgment of the Owner and the Architect, to those specified herein. Wherever an article, or any class of materials, is specified by the trade name or by the name of any particular patentee, manufacturer, or dealer, it shall be taken as intending to mean and specify the article of material described or any other equal thereto in quality, finish, performance, durability, and serviceability, in the judgment of the Owner and the Architect, for the purpose for which it is or they are intended.

B. If the Contractor desires to use material or equipment other than that specified, he/she shall submit a request for approval of such substitution, in writing, to the Project Manager by no later than ten (10) days prior to bid opening. Substitution requests will not be considered if received after the time stipulated.

C. The Owner does not guarantee that alternative articles, components, materials, or equipment other than the item specified by trade name or other specific identification, will fit within the design parameters of the Project without alteration of the Project design by the Contractor.

D. The Owner has the right to reject any proposed alternative material which requires alteration of the project design which impacts the safety of the public or the user of a completed facility. If the proposed alternative material requires alteration of the design of the Project or any aspect thereof, and said alterations are acceptable to the Owner, the Contractor shall be responsible for performing said alterations at no additional cost to the Owner.

E. Submittals for approval of substitute materials shall contain sufficient detailed information, descriptive brochures, drawings, samples, or other data as is necessary to provide a detailed side-by-side comparison to the specified materials. It is the sole responsibility of the Contractor to submit complete descriptive and technical information so the Project Manager can make proper appraisal. Lack of either proper or sufficient information shall constitute cause for rejection. Reference to product data will not be acceptable.

F. It is the Contractor's responsibility to confirm and correlate all quantities and dimensions, and coordinate with all trades whose work may be affected by the requested substitution.

2.46 REFERENCE TO STANDARDS

A. Reference to known standards shall mean and intend the latest edition or amendment published prior to date of these Specifications, unless specifically indicated otherwise, and to such portions of it that relate and apply directly to the material or installation called for on the Project.

B. Where material is specified solely by reference to standard specifications, the Contractor shall, if requested by the Project Manager, submit to the Project Manager for his/her approval, data on all such material proposed to be incorporated into the Work of the Contractor, listing the name and address of the vendor, the manufacturer or producer, and the trade or brand names of such materials.

2.47 SPECIFICATIONS

A. The Specifications are organized into Divisions, Sections, and Trade headings based on the Construction Specifications Institute's Master format and the Master format numbering system. This organization shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of the Work to be performed by any trade. The Contractor shall be responsible for examining all Sections of the Specifications for interrelated items of the Work, and for furnishing each item identified or specified.

B. No responsibility will be assumed by the Owner, Architect, or the Project Manager for omissions or duplications by the Contractor in the completion of the Contract due to any alleged discrepancy in the arrangement of the material in these Specifications, nor shall any such segregation of work and materials operate to make the Project Manager an arbiter in defining the limits to the agreements between the Contractor and his/her Subcontractors or suppliers.

C. The misplacement, addition, or omission of any letter, word, or punctuation mark shall in no way damage the true spirit, intent, or meaning of these Specifications.

D. The words "shown", "indicated", "noted", "scheduled" or words of that effect shall be understood to mean that reference is made to Drawings accompanying these Specifications.

E. Where reference herein is made to colors or finishes "as selected", the reference is to the Architect with concurrence by the Owner.

2.48 APPROVED APPLICATORS

A. Where specific instructions in these Specifications require that a particular product and/or materials be installed and/or applied by an "approved applicator" of the manufacturer, it shall be the Contractor's responsibility to ensure that any Subcontractors used for such work be approved applicators.

B. Contractor accordingly shall bear any and all costs, and shall reimburse Owner for any such costs incurred by Owner, resulting from Contractor’s failure to insure the use of an “approved applicator”.

2.49 DELIVERY AND STORAGE OF MATERIALS

A. Deliver all manufactured materials in the original packages, containers, or bundles (with the seals intact), bearing the name or identification mark of all manufacturers.

B. Deliver fabrications in as large assemblies as practicable and where specified to be shop-primed or shop-finished; they shall be packaged or crated as required to preserve such priming or finish intact and free from abrasion.

C. Store all materials in such manner as necessary to properly protect same from damage, as materials or equipment damaged by handling, weather, dirt or from any other cause will not be acceptable.

D. Store materials so as to cause no obstructions (i.e. stored off all sidewalks and other walkways, roadways, and underground services). The Contractor shall be responsible for protecting from damage all material and equipment furnished under the Contract.

2.50 QUALITY OF WORK

A. Where not more specifically described in any of the various Sections of these Specifications, the quality of work shall conform to all of the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction, or installation regularly furnished or required for completion of the work (including any finish), and for successful operation as intended of the Project and the component thereof corresponding to that work.

B. All Work shall be executed by mechanics skilled in their respective lines of work.

C. When completed, all parts shall have been durably and substantially built and shall present a neat, finished appearance.

2.51 HOURS OF WORK

A. Eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and it is expressly stipulated that no worker employed at any time by the Contractor, or by a Subcontractor under this Contract, upon the Work, shall be required or permitted to work thereon more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week, except as provided in Sections 1810-1815 inclusive, of the Labor Code of the State of California, all the provisions of which are deemed to be incorporated herein as if set forth in full; and it is further expressly stipulated that for each and every violation of said last named stipulation, said Contractor shall forfeit, as a penalty to the Owner, fifty dollars ($50.00) for each worker employed by the Contractor in the execution of this Contract, for each calendar day during which said worker is required or permitted to labor more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week in violation of any of said provisions of the Labor Code.

B. Notwithstanding the above stipulations, pursuant to Section 1815 of the Labor Code, work performed by employees of contractors in excess of eight (8) hours per day and forty (40) hours during any one (1) week shall be permitted on the Project upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and a half (1 1/2) times the basic rate of pay.

2.52 WAGE RATES AND RELATED LABOR COMPLIANCE REQUIREMENTS

A. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations (DIR), including the obligation to submit certified payroll records directly to the DIR Compliance Monitoring Unit (CMU) at least monthly using the CMU's eCPR system. Detailed information may be obtained on the State of California's Department of Industrial Relations website, www.dir.ca.gov/dlse/cmu/CMU.

The Contractor shall also submit certified payroll records of the Contractor, Subcontractors, and all Sub-subcontractors of any tier to the Inspector of Record at least monthly.

B. Contractor shall, and shall cause each of its Subcontractors (as defined in Labor Code section 1722.1) to provide written proof that they are currently registered with the California Department of Industrial Relations at the time of bid submittal, and have paid the applicable annual fee and are thereby qualified to submit a bid and to perform public work pursuant to Labor Code section 1725.5, prior to award of this Contract or any subcontract hereunder. No bid shall be accepted, nor shall this Contract or any subcontract hereunder, be entered into without such proof.

C. Pursuant to Section 1770-1780 of the Labor Code of the State of California, the Director of the Department of Industrial Relations has determined the general prevailing rates of wages and rates for legal holidays and overtime in the locality in which this work is to be performed, which under Labor Code Section 1773.1 are deemed to include employer payments for health and welfare, pension, vacation, travel time, and subsistence pay, and apprenticeship or other authorized training programs, for each craft or type of worker or mechanic needed to perform this contract. Said wage rates are available only at the Fresno County Department of Public Works and Planning, Design Division, and will be made available to any interested person upon request. Minimum wage rates for this Project, as predetermined by the Secretary of Labor, are set forth in the Special Provisions. If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the Prevailing Wage Rates predetermined by the Director of the Department of Industrial Relations of the State of California for similar classifications of labor, the contractor and his subcontractors shall pay not less than the higher wage rate.

D. It shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any Subcontractor under him/her, to pay not less than the said specified rates to all laborers, workers, and mechanics employed by them in the execution of the Contract, and to pay all laborers, workers, and mechanics not less often than once weekly. The Contractor to whom the Contract is awarded shall post a copy of the determination of prevailing wages at the job site. The Contractor shall require all Subcontractors to comply with Sections 1770-1780 of the Labor Code of the State of California and shall insert into every subcontract the requirements contained therein.

E. The Contractor shall comply with Labor Code Section 1775. In accordance with said Section 1775, it is hereby further agreed that the Contractor shall forfeit to the Owner, as a penalty, fifty dollars ($50.00) for each laborer, worker, or mechanic employed for each calendar day or portion thereof, who is paid less than the said stipulated rates for any work done under the Contract, by him/her, or by any Subcontractor under him/her. The difference between said stipulated rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than said stipulated 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 showing the name, address, social security number, work classification, 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/her in connection with the public work. The records shall be open at all reasonable hours to the inspection of the Owner, to its officers and agents, and to the Division of Labor Law Enforcement of the State Department of Industrial Relations, its deputies and agents, or as otherwise provided by applicable law (including but not limited to Labor Code 1776).

F. In case it becomes necessary for the Contractor or any Subcontractor to employ on the Work under this Contract any person in a trade or occupation (except executive, supervisory, administrative, clerical, or other non-manual workers as such) for which no minimum wage rate is specified, the Contractor shall immediately notify the Owner, who shall promptly thereafter determine the prevailing rate for such additional trade or occupation from the time of the initial employment of the person affected and during the continuance of such employment.

2.53 APPLICATION OF HIGHEST STANDARDS AND REQUIREMENTS

Whenever two (2) or more standards or requirements appear in these General Conditions or in any other part of the Contract Documents that form the Contract, the highest standard or requirement shall be applied and followed in the performance under this Contract.

2.54 NONDISCRIMINATION IN EMPLOYMENT

Contractor shall comply with all Federal and State Laws prohibiting discrimination in employment, including the following:

A. California Labor Code Section 1735, which prohibits discrimination in employment on any basis listed in subdivision (a) of Section 12940 of the Government Code, as those bases are defined in Sections 12926 and 12926.1 of the Government Code, except as otherwise provided in Section 12940 of the Government Code, and applies to all employers, employment agencies and labor organizations.

B. Title VII of the Federal 1964 Civil Rights Act (42 U.S.C. Section 2000e - 2000e - 17) which prohibits employment discrimination on the basis of race, color, sex, religion, or national origin, and applies to all employers that employ at least fifteen (15) workers during each working day in each of twenty (20) or more calendar weeks in the current or preceding year.

C. In addition to these two (2) laws of general application listed in the immediately preceding paragraphs A and B, there are other Federal and State laws that prohibit employment discrimination in particular cases.

D. The Owner is an Affirmative Action Employer and expects all of its contractors and suppliers to familiarize themselves with, and comply with, all applicable laws relating to employment discrimination.

E. To the extent required by law, the Contractor shall meet all requirements of law relating to the participation of minority, women, and disabled veteran business enterprise contracting goals, and shall comply with Public Contract Code 10115 et seq. and all applicable regulations. Contractor further agrees that, when required, Contractor shall ensure compliance by all Subcontractors and shall complete all forms required by all agencies exercising jurisdiction over the Project.

2.55 APPRENTICES

A. Pursuant to Sections 1770-1780 of the Labor Code of the State of California, the Director of the Department of Industrial Relations has determined the general prevailing rate of wages in the locality for each craft or type of worker needed to execute the work. Said wage rates pursuant to Section 1773.2 of the Labor Code are on file with the Clerk of the Fresno County Board of Supervisors, and will be made available to any interested person on request. A copy of this wage scale may also be obtained at the following Web Site: *https://www.dir.ca.gov/OPRL/*.

B. Pursuant to Section 1775 of the Labor Code of the State of California, nothing in this Article shall prevent the employment of properly registered apprentices upon public works. Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she is employed, and shall be employed only at the work of the craft or trade to which he/she is registered.

C. Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at Section 3070), Division 3, of the Labor Code, are eligible to be employed on public works. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she is training.

2.56 PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted, and this contract shall be read and enforced as though it

were included, and if through mistake or otherwise, any provision is not inserted or is not correctly inserted, upon application of either party the contract shall be amended to make the insertion or correction.

2.57 DRUG-FREE WORKPLACE CERTIFICATION

A. The Contractor shall comply with Government Code Section 8355 in matters relating to providing a drug-free workplace.

B. The Contractor shall publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of controlled substance is prohibited, and specifying actions to be taken against employees for violations, as required by Government Code Section 8355(a).

C. The Contractor shall establish a Drug-Free Awareness Program as required by Government Code 8355(a)(2), to inform employees about all of the following:

1. The dangers of drug abuse in the workplace,

2. The Contractor's policy for maintaining a drug-free workplace,

3. Any available counseling, rehabilitation, and employee assistance programs,

4. Penalties that may be imposed upon employees for drug abuse violations.

D. Provide as required by Government Code 8355(c), that everyone who provides work under the Agreement:

1. Will receive a copy of the company's drug-free policy statement, and

2. Will agree to abide by the terms of the Contractor's statement as a condition of employment on the contract.

2.58 BUILDING PERMIT AND OTHER PERMITS

The Building permit shall be obtained and paid for by the Owner. All other required permits are the responsibility of the Contractor to obtain. Fees for all other required permits shall be reimbursed to the Contractor at actual cost when the County is presented with a valid receipt.

2.59 CODES AND REGULATIONS

All work, materials, and equipment shall be in full compliance with the California Building Code; California Plumbing Code; California Electrical Code; California Mechanical Code; California Fire Code; California Energy Code; as those codes may be amended from time to time; Cal/OSHA Safety Regulations; and all Federal, State,

and Local laws, ordinances, regulations and Fresno County Charter provisions in effect and applicable in the performance of the work.

END OF SECTION

FEDERAL REQUIREMENTS FOR ARPA CONSTRUCTION PROJECTS

General

The work will be financed in whole or in part with Federal funds, and therefore all of the Federal statutes, rules, regulations, and provisions applicable to work financed in whole or in part with Federal funds will apply.

In addition to the provisions in the Agreement, the Contractor shall comply with the following:

Performance Of Previous Contracts

The bidder shall execute the “Certification with Regard to the Performance of Previous Contracts or Subcontracts Subject to the Equal Opportunity Clause and the Filing of Required Reports” located in the proposal. No request for subletting or assigning any portion of the contract in excess of $10,000 will be considered under the provisions of Section VII of the required contract provisions unless such request is accompanied by the Certification referred to above, executed by the proposed subcontractor.

Non-Collusion Provision

The provisions in this section are applicable to all contracts except contracts for Federal Aid Secondary projects. Title 23, United States Code, Section 112, requires as a condition precedent to approval by the Federal Highway Administrator of the contract for this work that each bidder file a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the submitted bid. A form to make the non-collusion affidavit statement required by Section 112 as a certification under penalty of perjury rather than as a sworn statement as permitted by 28, USC, Sec. 1746, is included in the proposal.

Contracting with Small and Minority Businesses, Women's Business Enterprises, and Labor Surplus Area Firms

Conducting the following steps to ensure the use of small and minority businesses, women’s business enterprises, and labor surplus area firms when possible:

- Place such organizations that are qualified on solicitation lists;
- Ensure such organizations are solicited whenever they are potential sources;
- Divide total requirements, when economically feasible, into smaller tasks or quantities;
- Establish delivery schedules, where the requirement permits, which encourage their participation;
- Use the services and assistance, as appropriate, of the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and
- Require prime contractor to conduct the above steps if subcontracting.

Prohibition of Certain Telecommunications and Video Surveillance Equipment and Services

In response to significant national security concerns, the agency shall check the prohibited vendor list before making any telecommunications and video surveillance purchase because recipients and subrecipients of federal funds are prohibited from obligating or expending loan or grant funds to:

- Procure or obtain;
- Extend or renew a contract to procure or obtain; or
- Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

The prohibited vendors (and their subsidiaries or affiliates) are:

- Huawei Technologies Company;
- ZTE Corporation;
- Hytera Communications Corporation;
- Hangzhou Hikvision Digital Technology Company;
- Dahua Technology Company; and
- Subsidiaries or affiliates of the above-mentioned companies.

In implementing the prohibition, the agency administering loan, grant, or subsidy programs shall prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.

Executive Order N-6-22:

Under Executive Order N-6-22 as a contractor, subcontractor, or grantee, compliance with the economic sanctions imposed in response to Russia's actions in Ukraine is required, including with respect to, but not limited to, the federal executive orders identified in the EO and the sanctions identified on the U.S. Department of the Treasury website (https://ofac.treasury.gov/sanctions-programs-and-country-information/russia-related-sanctions). Failure to comply may result in the termination of contracts or grants, as applicable. Specially Designated Nationals and Blocked Persons List (SDN) (https://sanctionslist.ofac.treas.gov/Home/SdnList).

ARPA CONTRACT PROVISIONS

The Contract may be funded in part by the federal grant funding received by the COUNTY from the American Rescue Plan Act ("ARPA"). Therefore, CONTRACTOR must comply with all federal laws and regulations applicable to the receipt of ARPA grants, including, but not limited to, the contractual provision set forth in 2 CFR, Part 200, in connection with the CONTRACTOR's performance of the work or services covered by the Contract (the "Project"). All such federal laws and regulations shall be deemed to be inserted in the Contract and the Contract shall be read and enforced as though such federal laws and regulations were included therein. In addition, the CONTRACTOR agrees to the following specific provisions:

Equal Employment Opportunity

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

Rights and Remedies

(1) The duties and obligations imposed by the Contract Documents and the rights and remedies available hereunder shall be in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

(2) No action or failure to act by or on behalf of the Owner regarding any deficiency, breach or default in performance by the Contractor under the Contract Documents, shall be deemed or construed to constitute acquiescence of the Owner in connection therewith or with regard to any subsequent deficiency, breach or default in performance by the Contractor; nor shall any such prior act of failure to act by or on behalf of Owner be deemed or construed as a waiver of any rights in favor of Owner regarding any such deficiency, breach or default in performance by the Contractor, regardless of the similarity to the prior incident or circumstance when no action was taken regarding any alleged deficiency, breach or default in performance by the Contractor.

Termination of Convenience

Under circumstances other than those set forth in Section IV of the Agreement governing termination of this Contract for cause, this Contract may be terminated by the County, with no liability to the contractor accruing to the County based solely upon the County's exercise of such right, upon the giving of thirty (30) days advance written notice of an intention to terminate to the contractor. In the event of such termination, the contractor shall cease work on such date as is specified by the County in that notice, and the contractor shall be entitled to payment for all work performed through and including that date. The County and the contractor shall meet and confer in an effort to resolve any and all remaining issues relating to completion of the work, payment to the contractor of any incurred and unpaid costs to which the contractor may claim to be entitled under the Contract, and any other issues pertaining to final resolution of the contractual relationship. In the event of any remaining disputes after the parties have met and conferred, they shall be resolved in accordance with 9-1.23 RESOLUTION OF CONTRACT CLAIMS of the Special Provisions.

Copeland Anti-Kickback Act

(1) The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract. Each contractor or subrecipient 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.

(2) The contractor or subcontractor shall insert in any subcontracts the above clause in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.

(3) A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor or subcontractor as provided in 29 CFR 5.12.

Contract Work Hours and Safety Standards Act

(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. 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 watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $27 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) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The **County of Fresno** shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or 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, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

Clean Air Act and the Federal Water Pollution Control Act

The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq., and the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

(1) The contractor agrees to report each violation to the County and understands and agrees that the County will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

(2) The contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by ARPA.

Suspension and Debarment

(1) This contract is a covered transaction for purposes of 2 CFR, part 180 and 2 CFR, part 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 CFR § 180.995) or its affiliates (defined at 2 CFR § 180.905) are excluded (defined at 2 CFR § 180.940) or disqualified (defined at 2 CFR § 180.935).

(2) The contractor must comply with 2 CFR, part 180, subpart C and 2 CFR, part 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by the County. If it is later determined that the contractor did not comply with 2 CFR, part 180, subpart C and 2 CFR, part

3000, subpart C, in addition to remedies available to the County, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 CFR, part 180, subpart C and 2 CFR, part 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

Byrd Anti-Lobbying Amendment

Contractors who apply or bid for an award of $100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

Access to Records

(1) The Contractor agrees to provide the County of Fresno, the US Department of Treasury, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.

(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

Buy USA - Domestic Preference for Certain Procurements Using Federal Funds

Contractor should, to the greatest extent practicable under a Federal award, 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). The requirements of this section must be included in all subawards including all contracts and purchase orders for work or products under this award. For purposes of this section:

(1) “Produced in the United States” means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

(2) “Manufactured products” means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymerbased products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

SPECIFICATIONS

FRESNO COUNTY DEPARTMENT OF PUBLIC HEALTH
BASEMENT RENOVATION

1221 FULTON STREET
FRESNO, CALIFORNIA 93721

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SIGNATURES AND SEALS

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(559) 233-4138



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SECTION 01 1000
SUMMARY

PART 1 - GENERAL

1.01. PROJECT

A. Project Name: Fresno County Department Of Health Basement renovation

B. Owner's Name: County of Fresno

C. Architect's Name: Matthew B. Lopez, County of Fresno Capital Projects

D. This project will functionally renovate the basement of the Fresno County Department Of Health Building in Downtown Fresno that was previously used for laboratory space and was damaged by catastrophic flooding. Interior Improvements to the basement will be for staff support services, meeting, conference, and break rooms. Existing chiller and boiler rooms will remain. Plumbing, Mechanical, Electrical, Fire Suppression Systems will be updated

1.02. CONTRACT

A. Unless otherwise indicated, the Drawings and Specifications are directed to the General Contractor.

1.03. WORK BY OWNER

A. Furnishing provided by owner.

1.04. CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas as directed by Owner's Representative.

B. Arrange use of site and premises to allow:

1. Work by Others.
2. Work by Owner.
3. Use of public property as regulated by the City of Fresno.
4. Use of public property as regulated by the County of Fresno.

1.05. Parking of all vehicles shall be limited to those areas designated by the Owner's Representative.

PART 2 - PRODUCTS -NOT USED

PART 3 - EXECUTION -NOT USED

END OF SECTION

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SECTION 01 1100
SUMMARY OF WORK

PART 1 - GENERAL

1.01. RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification section, apply to work of this section.

1.02. PROJECT DESCRIPTION:

A. The Project name is Fresno County Department Of Public Health Basement Renovation, Fresno County, Fresno, CA, as shown on Contract Documents prepared by The County of Fresno and it's Consultants, dated 14 May 2020.

B. The Work consists of construction of additional walls and interior construction. In addition to new flooring, renewed wall finishes, new ceiling, new doors & windows and new casework, the work includes renovated Plumbing, Mechanical, Electrical, Fire Suppression systems

1. The Work includes structural steel, metal framed partitions, gypsum board, hardware, interior finishes and mechanical, plumbing, electrical systems upgrades.

1.03. QUALITY ASSURANCE:

A. The Contractor's duties include the following, unless specifically noted,

1. Provide and pay for
   a. Labor, material and equipment
   b. Tools, construction equipment and machinery
   c. Heat and utilities required for construction
   d. Other facilities and services necessary for proper execution and completion of the Work
2. Water: see specification section 'Temporary Facilities and Controls"
3. Pay legally required sales, consumer and use taxes.
4. Secure and pay for all site specific (Owner will pay all required fees) as necessary for proper execution and completion of the Work.
   a. Licenses
   b. Permits and Fees
   c. Government Fees
   d. Royalties
5. Give required notices.
6. Comply with codes, ordinance, rules, regulations, orders and other legal requirements of public authorities which bear on performance of Work.
   a. The Contractor shall certify in writing that no materials containing Asbestos are incorporated in the work, in accordance with the Asbestos Hazard Emergency Regulations Act.
7. Promptly submit written notice to Architect of observed variance.
8. Enforce strict discipline and good order among employees. Do not employ on the Work:
   a. Unfit persons
   b. Persons not skilled in assigned task

1.04. SITE CONDITIONS:

A. Work under other separate Contract may occur concurrently with and/or adjacent to the Work of this Contract. The Contractor shall coordinate his work with the work of these separate Contracts and shall cooperate with the Contractors of these separate Contracts, if they occur.

1.05. CONTRACTOR USE OF PREMISES:

A. General: The Contractor shall limit his use of the premises to the designated work areas so as to allow for Owner occupancy of adjacent spaces. Disruption of existing occupants and activities is to be kept at a minimum. Access to occupied areas and spaces is to be coordinated with the

Owner at least 48 hours in advance. Where disruption will be significant or when shut-off of any utilities to occupied spaces is required, then these shall be arranged to take place prior to 8:00 A.M. and after 5:00 P.M. and shall be coordinated with the Owner at least three work days in advance. Contractor shall include in bid any cost for overtime or extra cost related to working outside normal business hours.

B. Assume full responsibility for protection and safekeeping of Contractor's and Owner's material stored on premises, and keep the site and building secure at all times.

C. Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed. Conform to site rules and regulation affecting the Work while engaged in project construction.

1. Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees and the public at all times. Do not use these areas for parking or storage of materials.
2. Do not unreasonably encumber the site with materials or equipment. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary obtain and pay for such storage off-site.

D. Use of the Existing Building: Maintain the existing buildings in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building during the construction period.

1. Do not load structure with weight that will endanger structure.

1.06. OWNER OCCUPANCY:

A. Full Owner Occupancy: The Owner will occupy the site and areas directly adjacent to the construction during the entire period of construction. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Owner's operation and security.

1.07. OWNER-FURNISHED ITEMS:

A. The Contractor will carefully remove items that are to be relocated and or reused in other areas of the work. The Contractor shall furnish new items where existing Items are damaged during removal. Damaged items shall not be re-installed. Contractor shall be responsible for the removal and re-installation of designated items. The Contractor shall notify the Architect of any existing items that are damaged before removal for subsequent re-installation.

B. Obtain and pay for use of additional storage of salvaged items, as needed.

PART 2 - PRODUCTS (Not applicable).

PART 3 - EXECUTION (Not applicable).

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Correlation of Contractor submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

1.02. SCHEDULE OF VALUES

A. See General Conditions -"Payments and Completion" for additional requirements. If they are in conflict with this section, follow the more restrictive requirement.

B. Submit a printed schedule on AIA Form G703 -Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.

C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement

D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. For each item provide a column for listing each of the following:

1. Item Number
2. Description of Work
3. Scheduled Values

E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.03. APPLICATIONS FOR PROGRESS PAYMENTS

A. See General Conditions -"Payments and Completion" for additional requirements. If they are in conflict with this section, follow the more restrictive requirement.

B. Payment Period: Submit at intervals stipulated in the Agreement

C. Present required information in typewritten form.

D. Form: AIA G702 Application and Certificate for Payment and AIA G703 -Continuation Sheet including continuation sheets when required.

E. For each item, provide a column for listing each of the following:

1. Item Number.
2. Description of work.
3. Scheduled Values.
4. Previous Applications.
5. Work in Place and Stored Materials under this Application.
6. Authorized Change Orders.
7. Total Completed and Stored to Date of Application.
8. Percentage of Completion.
9. Balance to Finish.
10. Retainage.

F. Execute certification by signature of authorized officer.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.

H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

I. Submit three copies of each Application for Payment on the 25th day of each month. Payment amount may be projected through to the end of the month.

J. Include the following with the application:

1. Transmittal letter as specified for Submittals in Section 01 3000.
2. Partial release of liens from major Subcontractors and vendors.
3. Affidavits attesting to off-site stored products.

K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.04. MODIFICATION PROCEDURES

A. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.

B. Construction Change Directive: Architect may issue a document, signed by Owner, instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time.
2. Promptly execute the change in Work.

C. Proposal Request: Architect may issue a document which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor shall prepare and submit a fixed price quotation within 10 days unless otherwise requested.

D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.

E. Computation of Change in Contract Amount:

1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.
4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

F. Substantiation of Costs: Provide full information required for evaluation.

1. Provide the following data:
   a. Quantities of products, labor, and equipment.
   b. Taxes, insurance, and bonds.
   c. Overhead and profit.
   d. Justification for any change in Contract Time.
   e. Credit for deletions from Contract, similarly documented.
2. Support each claim for additional costs with additional information:
   a. Origin and date of claim.
   b. Dates and times work was performed, and by whom.

c. Time records and wage rates paid.

d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

G. Execution of Change Orders: After Architect has approved the proposed Change Order, if applicable, the Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract on AIA G701.

H. After execution of Change Order, 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.

I. 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.

J. Promptly enter changes in Project Record Documents.

1.05. APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 7800.

2. Receipt of all unconditional lien releases.

3. Architect's acceptance of all corrected punch list items.

END OF SECTION

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SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Preconstruction meeting.

B. Site mobilization meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Submittals for review, information, and project closeout.

F. Number of copies of submittals.

G. Submittal procedures.

1.02. PROJECT COORDINATION

A. Owner Representative: Matthew B. Lopez Architect

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Architect.

D. Comply with Architect's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Architect for use of temporary utilities and construction facilities.

F. Coordinate field engineering and layout work under instructions of the Architect.

G. Make the following types of submittals to the Architect:

1. Requests for interpretation.
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Manufacturer's instructions and field reports.
6. Applications for payment and change order requests.
7. Progress schedules.
8. Coordination drawings.
9. Closeout submittals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01. PRECONSTRUCTION MEETING

A. The Architect will schedule the meeting.

B. Attendance Required:

1. Architect.
2. Contractor.
3. All major Sub-Contractors.

C. Agenda:
   1. Designation of personnel representing the parties to Contract, Contractor, and Architect.
   2. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   3. Scheduling.

CI. Record minutes and distribute copies within two days after meeting to participants, with one copy to Architect, participants, and those affected by decisions made.

3.02. SITE MOBILIZATION MEETING

A. The Architect will schedule a meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's Superintendent.
   5. Major Subcontractors.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities.
   5. Survey and building layout.
   6. Security and housekeeping procedures.
   7. Life safety program and temporary protection.
   8. Schedules.
   9. Application for payment procedures.
   10. Procedures for testing.
   11. Procedures for maintaining record documents.
   12. Requirements for start-up of equipment.
   13. Inspection and acceptance of equipment put into service during construction period.
   14. Commissioning / calibration

D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, participants, and those affected by decisions made.

3.03. PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.

6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. Record minutes and distribute copies within two days after meeting to participants, with one copy to Architect, participants, and those affected by decisions made.

3.04. CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

3.05. SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Shop drawings.
3. Samples for selection.
4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 -CLOSEOUT SUBMITTALS.

3.06. SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator. No action will be taken.

3.07. SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
2. Operation and maintenance data.

3. Warranties.
4. Bonds.
5. Other types as indicated.

3.08. NUMBER OF COPIES OF SUBMITTALS

A. Soft copies: submit a soft copy (pdf) format of all submittals.

B. Documents for Review:
   1. Small Size Sheets, Not Larger than 8-1/2 x 11 inches: Submit the number of copies which the Contractor requires.
   2. Larger Sheets, Not Larger than 36 x 48 inches: Submit one copy.

C. Documents for Information: Submit one copy.

D. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

E. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. Retained samples will not be returned to Contractor unless specifically so stated.

3.09. SUBMITTAL PROCEDURES

A. Sequentially number the transmittal form. Revise submittals with original number and a sequential revision number.

B. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

D. Deliver submittals to Architect at business address.

E. Schedule submittals to expedite the Project, and coordinate submission of related items.

F. For each submittal for review, allow 10 working days excluding delivery time to and from the Contractor.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Architect review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. References and standards.

B. Quality assurance submittals.

C. Control of installation.

D. Tolerances.

E. Testing and inspection services.

F. Manufacturers' field services.

1.02. REFERENCES

A. ASTM C 1021-08 -Standard Practice for Laboratories Engaged in Testing of Building Sealants.

B. ASTM C 1077-11c -Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

C. ASTM C 1093-12 -Standard Practice for Accreditation of Testing Agencies for Unit Masonry.

D. ASTM D 3740-12 -Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

E. ASTM E 329-11c -Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

F. ASTM E 543-09 -Standard Practice for Agencies Performing Nondestructive Testing.

1.03. SUBMITTALS

A. Testing Agency Qualifications:

1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Test Reports: After each test / inspection, promptly submit two copies of report to Architect and to Contractor.

1. Include:
   a. Date issued.
   b. Project title and number.
   c. Name of inspector.
   d. Date and time of sampling or inspection.
   e. Identification of product and specifications section.
   f. Location in the Project.
   g. Type of test/inspection.
   h. Date of test/inspection.
   i. Results of test/inspection.
   j. Conformance with Contract Documents.
   k. When requested by Architect, provide interpretation of results.
2. Test reports are submitted for Architect's knowledge as contract administrator, for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.

1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.

1. Submit report in duplicate within 30 days of observation to Architect for information.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect.

1.04. REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference 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 of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copies at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05. TESTING AND INSPECTION AGENCIES

A. Owner will employ and pay for services of an independent testing agency to perform specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 - PRODUCTS -NOT USED

PART 3 - EXECUTION

3.01. CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step, in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. 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.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02. TOLERANCES

A. Monitor fabrication and installation tolerance control of 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 before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03. TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests inspections specified.

C. Limits on Testing/inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Cooperate with laboratory personnel and provide access to the Work and to manufacturers' facilities.
   2. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   3. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   4. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re testing will be charged to the Contractor.

3.04. 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, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05. DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4100
REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Other applicable regulatory agencies are not specifically identified.

1.02. QUALITY ASSURANCE

A. Perform Work in conformance with the applicable requirements of regulatory agencies, and CCR Title 8, Title 19, Title 22, and Title 24.

PART 2 - PRODUCTS -NOT USED

PART 3 - EXECUTION -NOT USED

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01. GENERAL

A. See General Conditions -"Use of Site" for additional requirements. If they are in conflict with this section, follow the more restrictive requirement.

1.02. SECTION INCLUDES

A. Temporary utilities.

B. Temporary telephone and facsimile service.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

H. Project identification sign.

I. Field offices.

1.03. TEMPORARY UTILITIES

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

B. Existing facilities may not be used.

1.04. TELEPHONE SERVICE

A. Provide, maintain, and pay for telephone & data services to field office at time of project mobilization.

1.05. TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.06. BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.07. FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.08. SECURITY

A. Coordinate with Owner's security program.

1.09. VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with governing authorities and Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, coordinate additional off-site parking with Owner.

E. Designate 2 parking spaces for Owner and Architect use.

1.10. WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Dispose of waste off-site weekly.

1.11. PROJECT IDENTIFICATION

A. Provide project identification sign if, and as required by Owner.

B. In addition to Project Name and other features required by the Owner, list the Owner, Architect, Professional Consultants and Contractor.

C. Obtain Owner's and Architect's approval of design prior to construction of the sign.

D. Erect on site at location acceptable to the Owner and Architect.

E. No other signs are allowed without Owner permission except those required by law.

1.12. FIELD OFFICES

A. Office: Weather tight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

1.13. REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing and permanent 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. REFERENCES

A. NFPA 70 -National Electrical Code; National Fire Protection Association 2020.

1.03. SUBMITTALS

A. 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.

B. Shop Drawing Submittals: Prepared specifically for this Project.

C. 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 manufacturers

D. Standard 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. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

B. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

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 One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

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 and place in location as directed; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.01. SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. '

C. A request for substitution constitutes a representation that the submitter:

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 for the substitution as for the specified product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

D. 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.

E. Substitution Submittal Procedure:

1. Submit a request for substitution for consideration. Limit each request to one proposed substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02. OWNER-SUPPLIED PRODUCTS, IF ANY

A. Owner's Responsibilities:

1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
2. Arrange and pay for product delivery to site.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:

1. Review Owner reviewed shop drawings, product data, and samples.
2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.

3.03. 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.

3.04. 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. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

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SECTION 01 7000
EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Pre-installation meetings.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

H. Closeout procedures, except payment procedures.

1.02. SUBMITTALS

A. Survey work: Submit name, address, and telephone number of Engineer before starting survey work.

1. On request, submit documentation verifying accuracy of survey work.
2. Submit a copy of site drawing signed by the Engineer, that the elevations and locations of the work are in conformance with Contract Documents .

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.
6. Include in request:
   a. Identification of Project.
   b. Location and description of affected work.
   c. Necessity for cutting or alteration.
   d. Description of proposed work and Products to be used.
   e. Alternatives to cutting and patching.
   f. Effect on work of Owner or separate Contractor.
   g. Written permission of affected separate Contractor.
   h. Date and time work will be executed.

1.03. QUALIFICATIONS

A. For survey work employ a professional engineer registered in California and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

1.04. COORDINATION

A. 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.

B. 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.

C. 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.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean-up of work of separate sections.

F. 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.

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 existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.02. PREPARATION

A. Prepare surfaces and remove surface finishes to provide for proper installation of new work and finishes.

B. Clean substrate surfaces prior to applying next material or substance.

C. Seal cracks or openings of substrate prior to applying next material or substance.

D. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03. PREINSTALLATION MEETINGS

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. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, participants, and those affected by decisions made.

3.04. LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

c. Protect survey control points prior to starting site work; preserve permanent reference points during construction. L

D. Promptly report to Architect the loss or destruction of any reference point or relocation required.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and layout by instrumentation and similar appropriate means.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.05. GENERAL INSTALLATION REQUIREMENTS

A. Install Products as specified in individual sections.

3.06. CUTTING AND PATCHING

A. See General Conditions -"Cutting and Patching" for additional requirements. If they are in conflict with this section follow the more restrictive requirement.

B. 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.

C. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new Products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400 to full thickness of the penetrated element.

3.07. PROGRESS CLEANING

A. See' General Conditions -"Cleaning Up" for additional requirements. If they are in conflict with this section follow the more restrictive and notify the Architect.

B. Maintain areas free of waste materials; debris, and rubbish. Maintain site in a clean and orderly condition.

C. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or-remote spaces prior to enclosing the space.

D. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

E. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

3.08. 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.

3.09. ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.10. FINAL CLEANING

A. Execute final cleaning prior to Substantial Completion and prior to final acceptance.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

D. Clean filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove Waste 'and surplus materials, rubbish', and construction facilities from the site.'

3.11. TOUCH-UP AND REPAIR

A. If any surface, material or equipment has been damaged, touchup and/or repair exposed areas in a manner acceptable to the Architect. Surface renovation and touch-up may be acceptable under some circumstances or, at the sole discretion of the Architect, complete renovation or replacement may be required.

3.12. CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

1. Provide copies to Architect.

B. Notify Architect when work is considered ready for Substantial Completion.

C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

E. Notify Architect when work is considered finally complete.

F. Complete items of work determined by Architect's final inspection.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Touch-up and repair.

E. Project record documents.

F. Operation and maintenance data.

G. Warranties.

H. Spare parts and maintenance materials.

I. Systems demonstration.

J. Final acceptance and Owner occupancy.

1.02. SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data: Unless otherwise stated in specific sections.

1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
2. Submit two sets of final documents in final form within 10 days after final inspection.

C. Warranties and Bonds: Unless otherwise stated in specific sections.

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 - PRODUCTS -NOT USED

PART 3 - EXECUTION

3.01. 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 the Architect.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress. Do all graphic work using instruments producing nonfading, clear, permanent marks. Use contrasting colors for different disciplines of work and where required for clarity. All markings and notations shall be neatly and accurately made. Make documents available at all times for review by the Architect. The Architect will not approve applications for payment until the Contractor can show that record documents are up to date.

E. Do not permanently conceal any work until required information has been recorded.

F. Product Data: Maintain one copy of each product data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.

G. 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.

H. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first 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.

3.02. OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03. OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.
2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

3.04. OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:

1. Description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Panel board Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

3.05. OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related. consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, 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.
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. Photocopies of warranties and bonds.

J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06. WARRANTIES

A. Categories of Specific Warranties: Warranties on the Work as specified in the General Conditions and in individual sections of these Specifications.

1. Special Project Warranty: A warranty specifically written and signed for a defined portion of the Work and, where required, countersigned by the subcontractor, installer, manufacturer or other entity enumerated in the Specifications.
2. Specified Product Warranty: A warranty which is required by the Contract Documents to be provided for a manufactured product incorporated into the Work, regardless of whether the manufacturer has published a similar warranty.
3. Coincidental Product Warranty: A warranty which is not specifically required by the Contract Documents other than as specified in this Section, but which is available on a product incorporated into the Work by virtue of the fact that the manufacturer of the product has a published warranty. Such warranties shall be provided to the Owner, but shall not be interpreted to detract from requirements of the Contract Documents.
4. Correction of Warranted Work: Contractor and first tier subcontractor(s) shall correct its (their) failed work by removal and replacement of the failed portions with new materials.
5. Related Damages and Losses: In connection with the Contractor's and first tier subcontractor's (s') correction of warranted work which has failed, Contractor shall remove and replace other Project work which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.
6. Warranty Period: A one-year correction period shall apply to all work, in addition to any other warranties which may be offered by any manufacturer, starting from Owner's accepted Date of Substantial Completion. Statute of Limitation period, for latent and patent defects, as a minimum, shall extend to as required by law in the State of California.
7. Reinstatement of Warranty Period: Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been corrected by replacement or restoration, the Contractor and first tier subcontractor(s) shall reinstate warranty by written endorsement for a time period equal to the original warranty period starting on date of acceptance of replaced or restored work.
8. Replacement Cost Obligations: Except as otherwise indicated, costs for replacing or restoring failing warranted units or products are the Contractor's and first tier

subcontractor's obligation, without regard for whether Owner has already benefited from use through a portion of anticipated useful service lives.

9. Provide duplicate copies. Documents executed by subcontractors, suppliers and manufacturers to be countersigned by the Contractor. Provide table of contents and assemble in binder with durable blue color plastic cover with edge pocket.
10. Submit prior to final Application for Payment. For equipment put into use with Owner's permission during construction, submit within 10 work days after first operation. For items of work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
11. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor do they relieve suppliers, manufacturers and installers required to countersign special warranties with the Contractor.
12. Form of Warranty: The General Conditions of the Contract cover the Contractor's responsibility to remedy defects due to faulty workmanship and materials which appear within one year from the Owner accepted Date of Substantial Completion. Guarantees for more than one year, where indicated in various sections of the Specifications, shall be in the form of a warranty written on the letterhead of the Contractor, subcontractor or supplier doing the work and/or supplying the item to be guaranteed. The format shall be per Exhibit A at the end of this section.

EXHIBIT A -FORM OF WARRANTY

SECTION _____ WARRANTY FOR

We hereby warrant that the product, which we have installed, has been done in accordance with the Drawings and Specifications, and that the Work, as installed, will fulfill the requirements of the warranty included in the Specifications. We agree to repair or replace any or all of our work, together with any other and adjacent work which may be displaced by so doing, that may prove to be defective in its workmanship or material, within a period of years for correction period, and years for warranty period, from the Owner-accepted Date of Substantial Completion of the above-named structure, without any expense whatsoever to the Owner, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above-mentioned conditions within a reasonable time, but in no event longer than thirty days after being notified in writing by the Owner, we, collectively or separately, do hereby authorize the Owner to proceed to have said defects repaired and made good at our expense, and we will honor and pay the costs and charges therefore upon demand.

Signed: _____
Subcontractor/Supplier
License No.: _____

Countersigned: _____

Contractor License No. _____

END OF SECTION

SECTION 02 82 13

ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 SUMMARY OF SCOPE OF WORK

A. General
   1. Asbestos Abatement Contractor shall supply all labor, materials, equipment, insurance, transport, and disposal to remove all identified asbestos-containing building materials from specified interior areas of the referenced Health Department Building site as specified or required to complete the specified Renovation as defined in the project design documents. Asbestos Abatement Contractor shall provide documentation that is:
      a. Currently certified for Asbestos Work by California State Contractor's Licensing Board.

      b. Currently registered for Asbestos Work with the State of California, Division of Occupational Safety and Health.

   2. At least one full-time employee on each shift shall be currently accredited as a Contractor/Supervisor and shall have successfully completed, in the preceding calender year, a course of instruction meeting the requirements for "Competent Person" (29 CFR 1926.1101(e)(ii) and (8 CCR 1529). Such person shall have knowledge and authority to act as "Competent Person" as defined by Title 8 CCR 1529 and CFR 1926.1101.

   3. The Asbestos Abatement Contractor shall maintain documentation on file that all Asbestos Abatement Contractor's employees meet the training requirements of Federal, State, and Local regulations. As a minimum, asbestos worker training shall comply with 40 CFR 763 (AHERA) and shall demonstrate evidence of such training by maintaining current refresher training equivalent to the required level of training.

   4. All work shall be conducted in accordance with applicable regulations, including but not limited to 40 CFR 763 (AHERA), 29 CFR 1926.1101 (OSHA), 40 CFR Part 61 (NESHAPS) and Title 8 CCR 1529 (Cal/OSHA Asbestos In Construction), including mandatory and non-mandatory appendices as applicable, and the requirements of the San Joaquin Valley Air Pollution Control District regulations.

B. Scope of Work: Asbestos Abatement
   1. Contractor shall abate all asbestos-containing building materials (ACBM's) at specified interior locations involving the subject structures so as to allow for renovation operations as defined in project design documents. The Contractor shall review the previous Asbestos and Lead Survey Report (attached as **Appendix A** to this specification) prepared by T. Brooks & Associates, A Division of Provost and Pritchard and dated January 2, 2025 so as to determine locations of identified asbestos-containing materials (ACM's) which will be impacted by the proposed renovation operations based on review of asbestos survey and all project design documents.

2. All work involving disturbance of ACBM's shall be conducted using work methods, and controls hear in identified and/or as required under applicable regulations. Abatement work shall be conducted in accordance with applicable regulations and in a manner which protects the health and safety of abatement workers, other trades, County of Fresno employees, the general public, and others during the work. ACBM's shall be wetted continuously during abatement operations to preclude generation of airborne dust and visible emissions.

3. At no time shall non-asbestos trained, unprotected workers or others enter any established "Regulated Area" established by the contractor, or participate in work operations for which they are not specifically trained and licensed, and for which hazards exist for which they are not protected.

4. The Contractor shall thoroughly review all project design documents, including but not limited to: construction drawings, project specifications, project addendums, and previous asbestos survey report to determine locations of identified and/or presumed ACBM, and ACCM's to be impacted in order to complete the specified scope of work under the agreement. Contractor shall not request additional compensation or extension of contract based upon their failure to accurately determine the scope of work, and based upon their review of all project design documents, asbestos survey, available data, and field verification of quantities, locations, and existing conditions affecting completion of the work.

5. The Contractor shall be responsible for accurate determination of material quantities and locations, and all conditions effecting their execution of the work under the contract.

6. Scope of work may include disassembly of existing building systems, components, building elements, and equipment to access ACBM's for purposes of abatement, or to complete the required scope of work under the contract. Where required, the Contractor shall restore elements disassembled as part of the work to the satisfaction of the County of Fresno.

7. Perimeter air monitoring may be conducted by the County of Fresno's Designated Representative during abatement phase to ensure worker and site safety, and to ensure suitability and effectiveness of means utilized by Contractor in the performance of the work. This sampling shall not relieve Asbestos Abatement Contractor of responsibility of performing representative personal air sampling for each shift. Personal air sampling shall be conducted in accordance with Title 8 CCR 1529. Failure of Contractor to perform personal air sampling operations to satisfaction of County of Fresno's Designated Representative, or failure to provide laboratory results within stipulated time period (48 hrs.) will allow County of Fresno to have independent personal air monitoring operations conducted on its' behalf, and to deduct cost of lab services from monies owned to Contractor under the Agreement. Costs may include County of Fresno's Designated Representative's costs, shipping charges, and fees associated with laboratory analysis.

8. County of Fresno shall approve in writing all additional, unforseen abatement work necessitating a change in contract price. Cost for such work shall be agreed upon by Contractor and County of Fresno prior to initiating or altering work effecting such materials. Negotiated costs shall be all inclusive and shall reflect all costs including labor, materials, insurance, disposal, overhead and profit, etc.

9. A final visual inspection will be conducted by the County of Fresno's Designated Representative upon notification of completion of abatement related work by the Contractor. Successful passage of final visual inspection will be required as a prerequisite of completion of abatement related work prior to proceeding with Renovation phase of project.

10. County of Fresno's Designated Representative shall be notified when abatement work has been completed in order to schedule the final visual inspection. Notification shall be a minimum of 24 hours prior to requested final visual inspection. Final Visual Clearance Form shall be signed by County of Fresno's Designated Representative and Contractor Representative for each individual clearance performed as part of the project. Final Visual Inspection shall precede the Final Air Clearance to be performed at each containment area as a condition of acceptance of the work.

11. While efforts have been made to accurately list amounts, conditions, and requirements, the Contractor has the responsibility to verify quantity and quality of conditions based upon review of all project design documents, review of asbestos survey reports, and thorough examination of each location where abatement work will be conducted based upon the total scope of work.

12. All materials to be abated must be thoroughly wetted down and maintained in wetted condition throughout the abatement process.

13. All removed ACBM's will be double-bagged in accordance these specifications and regulatory requirements and transported to an appropriate disposal site. Labeling of all waste bags or on-site storage containers which include ACBM shall be labeled in accordance with Title 8 CCR 1529 while on the jobsite.

14. Personal air samples will be analyzed utilizing PCM (NIOSH 7400) methodology. Asbestos Abatement Contractor's personal air monitoring results shall be provided to County of Fresno's Designated Representative within forty-eight (48) hours of shift during which the samples were collected. Should personal or excursion samples exceed any PEL, County of Fresno's Designated Representative retains the right to require RUSH turn-around of future air samples until reduced levels are demonstrated. Costs of RUSH analysis and associated costs shall be the responsibility of the Contractor. Contractor shall not request additional compensation for compliance with this provision.

15. Upon successful passage of the Final Visual Inspection and Final Air Clearance(s) , affected areas shall be made accessible to non-abatement Contractors for completion of Renovation related work under the contract.

16. All work performed under the contract shall be conducted during hours as directed by the County of Fresno. County of Fresno shall mandate schedule based on its needs, and in a manner most conducive to complete all work associated with the project in a timely manner and in a sequence which suits the needs and preferences of the County of Fresno. Asbestos Abatement Contractor agrees to sequence their work in a manner prescribed by County of Fresno, and to cooperate with other Contractors in this regard.

17. Potential asbestos hazard/General Contractor Supervision
    a. Contractor shall educate all workers, supervisory personnel, other contractors,

and others at the jobsite of the nature of the work hazards and of proper work procedures which must be followed to protect themselves from asbestos hazards.

b. In compliance with Title 8 CCR 1529, the Prime Contractor shall provide general supervisory authority over all work performed by the Asbestos Abatement Contractor and shall provide oversight of all work performed by them. Refer to 8 CCR 1529 for description of duties and responsibilities of prime contractors engaged in asbestos removal projects.

1.2 LIMITATIONS - ASBESTOS ABATEMENT

APPLICABLE TO ALL SECTIONS OF SPECIFICATIONS FOR ASBESTOS ABATEMENT

A. SUMMARY

This Specification is specifically intended for use on the project indicated.

1. Where the term "Asbestos Abatement Contractor" is used throughout these specifications, it is meant to refer to the entity doing the asbestos and/or lead related work whether it is the Prime Contractor (Contractor) or an abatement subcontractor.
2. New legislation, regulations or case law may supersede portions of this Specification. Such superseding facts become, in effect, currently "applicable" laws, regulations and good practice within the intent of this Specification.
3. In case of discrepancies in this Specification, the strictest law, regulation, standard or good practice shall apply.
4. If new facts or discrepancies are evident to bidders prior to submission of the bid, they shall be brought to the attention of the County of Fresno so that the necessary addenda making amendments or corrections can be issued to all bidders.
5. Indications of quantity or quality of drawings are intended to be approximations of actual conditions. Bidder has the obligation to accurately assess quantities, quality, and accuracy of all such information prior to submitting a bid for the work. Such determination shall be made during initial or subsequent site visits (if permitted), review of all design documents, including all project construction drawings, all specification sections, addendums, and other relevant documents.
6. Contractor shall not submit a claim or "change order" for their failure to accurately determine the scope of abatement work based on the examination of the project site, and review of all relevant project documents. Contractor shall consider time schedules, delays, and other issues based on thorough review of scope of abatement work.

B. Abbreviations and Acronyms

1. **ACBM:** Asbestos-Containing Building Material
2. **ACM:** Asbestos-Containing Material
3. **APCD:** Air Pollution Control District
4. **AQMD:** Air Quality Management District
5. **AHERA:** Asbestos Hazard Emergency Response Act, 40 CFR 763 Part F
6. **AIHA:** American Industrial Hygiene Association
7. **ANSI:** American National Standards Institute
8. **ASA:** American Standards Association
9. **ASTM:** American Society for Testing & Materials
10. **CFR:** Code of Federal Regulations
11. **CERCLA:** Comprehensive Environmental Response, Compensation and Liability Act (42 USC 9601ff)
12. **CIH:** Certified Industrial Hygienist

13. **DOT:** U.S. Department of Transportation
14. **EPA:** Environmental Protection Agency
15. **F/CC:** Fibers per cubic centimeter (or air)
16. **FR:** Federal Register
17. **G(C)FI:** Ground (Circuit) Fault Interrupter
18. **HEPA:** High Efficiency Particulate Air (filter with 99.99 efficiency to 3 microns).
19. **HVAC:** Heating, Ventilation and Air Conditioning system
20. **IH:** Industrial Hygienist
21. **MSDS:** Material Safety Data Sheet
22. **OSHA:** Occupational Safety and Health Administration
23. **NAM:** Negative Air (Filtration) Machine
24. **NEC:** National Electrical Code
25. **NESHAPS:** National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61
26. **NFPA:** National Fire Protection Association
27. **NIOSH:** National Institute of Occupational Safety and Health
28. **COUNTY OF FRESNO:** County of Fresno
29. **COUNTY OF FRESNO'S REPRESENTATIVE**: T. Brooks & Associates, A Division of Provost and Pritchard
30. **PAPR:** Powered Air-Purifying Respirator
31. **PCM:** Phase Contract Microscopy (Air Sample Analysis)
32. **PLM:** Polarized Light Microscopy (Bulk Sample Analysis)
33. **RCRA:** Resource Conservation and Recovery Act
34. **SSN:** Social Security Number
35. **TBA:** T. Brooks & Associates, Inc. A Division of Provost and Pritchard
36. **TEM:** Transmission Electron Microscopy
37. **USC:** United States Code

C. Abbreviations and Acronyms - California
1. **CAC:** California Administrative Code
2. **Cal/OSHA:** California Division of Occupational Safety and Health
3. **CSC:** Construction Safety Orders
4. **DOSH:** Division of Occupational Safety and Health
5. **DHS:** Department of Health Services
6. **GISO:** General Industry Safety Orders

1.3 DEFINITIONS – GENERAL

1. **Abatement:** Procedure to control fiber release from ACBM's. Includes removal, encapsulation, enclosure, repair, Renovation and renovation activities.
2 **Aggressive Sampling:** Use of air moving equipment such as a leaf-blower and fans to re-entrain particulate prior to clearance sampling in a method substantially similar to that outlined in Appendix A of 40 CFR 763.90.
3. **Airlock:** A system for permitting ingress and egress with minimum air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained door- ways separated by a distance of a least 3 feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.
4. **Air Monitoring:** The process of measuring the fiber content of a known volume of air collected during a specific period of time as mandated by Appendix E of 29 CFR 1926 and 40 CFR 763.
5. **Air Clearance:** "Final Air Clearances" conducted in accordance with Appendix E of 40

CFR 763. TEM method will be utilzed unless indicated otherwise.

6. **Air Sampling Professional:** The professional contracted or employed by County of Fresno to supervise and/or conduct air monitoring and analysis schemes.
7. **Amended Water:** Water to which a surfactant has been added.
8. **Applicable Laws:** Laws, regulations and government guidelines for the protection of the environment, workers and others as adopted by specific jurisdictions including, but not limited to, federal, state, county, city and special enforcement districts which include AQMD/APCD, DOT, EPA, OSHA and NIOSH.
9. **Asbestos:** The asbestiform varieties of serpentine (chrysotile), riebeckite (crocidolite), cummingtonite - grunerite (amosite), anthophylite, actinolite and tremolite.
10. **Asbestos-Containing Material (ACM):** Material composed of asbestos of any type and in an amount greater than 1% by weight analyzed using the method as described in Appendix "A" subpart "F" 40 CRF Part 763 Section 1, Polarized Light Microscopy.
11. **Asbestos-Containing Building Material (ACBM):** Building material containing greater than 1.0% asbestos by weight found in or on interior structural members or other parts of a building.
12. **Asbestos-Containing Construction Material (ACCM):** Material containing asbestos in an amount between 0.1% - 1.0% by weight.
13. **Asbestos-Containing Waste Material:** Any material which is or is suspected of being or any material contaminated with an asbestos-containing material which is to be removed from a work area for disposal.
14. **Asbestos Debris:** Pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.
15. **Asbestos Project Manager:** An individual qualified by virtue of experience and education, designated as County of Fresno's Designated Representative and responsible for overseeing the asbestos abatement project.
16. **Authorized Visitor:** County of Fresno or it's Representatives, and any representative of a regulatory or other agency having jurisdiction over the project.
17. **Barrier:** Any surface that seals off the work area to inhibit the movement of fibers.
18. **Breathing Zone**: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
19. **Category I**: NESHAPS 1990 Final rule, "non-friable ACM are resilient floor covering, roofing products, gaskets, and packings. If these materials are in poor condition and are friable or they are subject to sanding, grinding, cutting, or abrading they are to be treated as friable material.
20. **Category II**: "Non-friable material ACM, excluding Category I, that meets the definition the same as Category I.
21. **Ceiling Concentration**: The concentration of an airborne substance that shall not be exceeded.
22. **Certified Industrial Hygienist (C.I.H.)**: An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.
23. **Clean Room:** An uncontaminated area or room which is a part of the work decontamination enclosure system with provisions for storage of worker's street clothes and clean protective equipment.
24. **Competent Person/Contractor Supervisor:** The individual working on behalf of the Asbestos Abatement Contractor, normally the Project Foreman. Individuals must have training equivalent to AHERA Contractor/Supervisor. Training must be by EPA accredited training provider.
25. **Contractor:** The individual and/or legal entity and its subcontractors and employees of the contractor and subcontractor awarded the contract. As used in this Specification, "Contractor" means, in addition to the actual license holder, any administrative or supervisory personnel having authority to act for the license holder on this project.

26. **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 sheets of plastic over an existing or temporarily framed doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway.
27. **Decontamination Enclosure System:** A series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of worker and equipment.
28. **Renovation:** The wrecking or taking out of any loan-supporting structural member of a facility together with any related handling operations.
29. **Disposal Bag**: A properly labeled 6 mil thick leak-tight plastic bags used for transporting asbestos waste from work and to disposal site as defined in OSHA appendix G to 29 CFR 1226.58 and NESHAPS 40 CFR part 61 subpart "M" 1990 Final Rule.
30. **Encapsulant:** A liquid material applied to asbestos containing material whichcontrols the possible release of asbestos fibers from the material either by creating amembrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).
    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.
    c. **Removal encapsulant**: a penetrating encapsulant specifically designed to minimize fiber release during removal of ACBM's rather that for in situ encapsulation.
31. **Encapsulation:** The application of an encapsulant to asbestos containing materials to control the release of asbestos fibers into the air.
32. **Enclosure:** The construction of an air-tight, impermeable, permanent barrier around asbetsos-containing material to control the release of asebestos fibers into the air.
33. **Equipment Decontamination Enclosure System:** That portion of a decontamination enclosure system designed for controlled transfer of materials and equipment into or out of the work area, typically consisting of a washroom and holding area.
34. **Facility:** Any institutional, commercial or industrial structure, installation or building.
35. **Facility Component:** Any pipe, duct, boiler, tank, reactor, turbine or furnace at or in a facility, or any structural member of a facility.
36. **Filter**: A media component used in respirators to remove solid or liquid particles from the inspired air.
37. **Fixed Object:** A piece of equipment or furniture in the work area which cannot beremoved from the work area.
38. **Friable Asbestos Material:** Asbestos containing material which can be crumbled to dust, when dry, under hand pressure and contains >1% asbestos by weight.
39. **Glovebag Technique:** A method with limited applications for removing smallamounts of friable asbestos-containing material from ducts, short pipingruns, valves, joints, elbows and other non-planar surfaces in a non-contaminated (plasticized) work area.
40. **HEPA Filter**: A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in diameter.
41. **HEPA Filter Vacuum Collection Equipment (or vacuum cleaner)**: High efficiency particulate air filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters should be of 99.97% efficiency for retaining fibers of 0.3 microns or larger.
42. **High-efficiency particulate air filter**: (HEPA) refers to a filtering system capable of trapping and retaining 99.97 percent of all mono-dispersed particles 0.3 um in diameter or larger.

43. **Negative Pressure Respirator**: A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
44. **Holding Area:** A chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area. The holding area comprises an airlock.
45. **"Monitoring":** Includes a) Visual inspection for the present of visible debris or emissions; b) Air sampling and analysis to determine f/cc inside and outside the work area; c) Bulk sample analysis of encapsulated materials; d) Performance evaluation of work methods, procedures and employees.
46. **Movable Object:** A piece of equipment or furniture in the work area which can be removed from the work area.
47. **Negative Pressure Ventilation System:** A portable exhaust system equipped with HEPA filtration and capable of maintaining a constant low velocity air flow into contaminated areas from adjacent uncontaminated areas.
48. **Outside Air:** The air outside buildings and structures.
49. **Owner:** The County of Fresno of the facility or site. As used in this Specification is the "County of Fresno"
50. **Personnel Monitoring:** Air sampling taken in the operator breathing zone (OBZ) of an asbestos worker to comply with OSHA regulations.
51. **Plasticize:** To cover floors and walls with plastic sheeting as herein specified.
52. **Pressure Differential and Ventilation System**: A local exhaust system, utilizing HEPA filtration capable of maintaining a pressure differential with the inside of the Work Area at a lower pressure than any adjacent area, and which cleans re-circulated air or generates a constant air flow from adjacent areas into the Work Area.
53. **Protection Factor**: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by respirator to the wearer.
54. **RACM**: Regulated Asbestos Contained Material means: a) Friable asbestos Material, b) Category I nonfriable ACM that has become friable, c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or d) or has become crumbled, pulverized or reduced to powder by the forces expected to act on the material in the course of Renovation or renovation operations regulated by 40 CFR part 60 subpart "M" 1990 Final Rule.
55. **Prior Experience:** Experience required of the Asbestos Abatement Contractor on asbestos projects of similar nature and scope to insure capability of performing the asbestos abatement in a satisfactory manner. Similarities shall be in areas related to material composition, project size, abatement methods required, number of employees and the engineering, work practice and personal protection controls required.
56. **Regulated Areas:** Area established to demarcate areas where airborne concentrations of asbestos may exceed the permissible exposure limit (29 CFR 1926.1101).
57. **Removal:** The stripping of any asbestos containing materials from surfaces of components of a facility.
58. **Renovation:** Altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded.
59. **Respirator**: A device designed to protect the wearer from the inhalation of harmful atmospheres.
60. **Shower Room:** A room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold or warm running water controllable at the tap and suitably arranged for complete showering during decontamination.
61. **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.

62. **Strip:** To take off friable asbestos materials from any part of a facility.
63. **Structural Member:** Any load-bearing member of a facility, such as beams and load-supporting walls or any non-load-supporting member, such as ceilings and non-load supporting walls.
64. **Surfactant:** A chemical wetting agent added to water to improve penetration.
65. **Time Weighted Average (TWA)**: The average concentration of a contaminant in air during a specific time period.
66. **Visible Emissions:** Any Emissions containing particulate asbestos materials that are visually detectable without the aid of instruments.
67. **Waste Transfer Airlock:** A decontamination system utilized for transferring containerized waste from inside to outside of the work area.
68. **Wet Cleaning:** The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other utensils which have been dampened with water and surfactant.
69. **Work Area:** Designated rooms, spaces, 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 or which are used by the Asbestos Abatement Contractor for ancillary operations such as offices, storage, mobilization or channelization. The work area is generally the portion of the facility which is under control of the Asbestos Abatement Contractor during the project.
70. **Worker Decontamination Enclosure:** A decontamination system consisting of a clean room, a shower room, and an equipment room separated from each other and from the work area airlocks and contained doorways. This system is used for all worker entries to and exits from the work area and for equipment and waste pass out for small jobs.

1.4 REFERENCE STANDARDS - ASBESTOS ABATEMENT

A. Summary

1. This sub-section sets forth governmental regulations and industry standards which are included and incorporated herein by reference and made a part of the specification.

2. This sub-section also sets forth those notices and permits which are known to County of Fresno, and which either must be applied for and received, or which must be given to governmental agencies before start of work.

3. Requirements include adherence to work practices and procedures set forth in applicable codes, regulations and standards.

4. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with codes, regulations and standards.

B. Codes and Regulations

1. General Applicability of Codes and Regulation and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

2. Asbestos Abatement Contractor Responsibility: The Asbestos Abatement Contractor shall assume full responsibility and liability for the compliance with all

applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, building occupants, visitors to the site, and persons occupying areas adjacent to the site.

3. The Asbestos Abatement Contractor is responsible for providing medial examinations and maintaining medical records of personnel as required by the applicable Federal, Sate and local regulations.

4. The Asbestos Abatement Contractor shall hold County of Fresno, or its Representatives harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

C. Applicable Publications
   1. The publications listed below forms a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

D. Code of Federal Regulations (CFR)
   1. U.S. Department of Labor
      a. 29 CFR 1910.20 Access to Employee Exposure and Medical Records
      b. 29 CFR 1910.134 Respiratory Protection
      c. 29 CFR 1910.145 Specification for Accident Prevention Signs and Tags
      d. 29 CFR 1910.1001 Occupational Exposure to Asbestos
      e. 29 CFR 1910.1200 Hazard Communication
      f. 29 CFR 1926.1101 Asbestos Tremolite, Anthophyllite and Actinolite

   2. U.S. Environmental Protection Agency
      a. 40 CFR 61 General Provisions Subpart A
      b. 40 CFR 61 National Emission Standard for Asbestos, Subpart M
      c. 40 CFR 61.152 Standard for Waste disposal for Manufacturing Renovation, Renovation, Spraying and Fabricating Operations
      d. 40 CFR 241 Guidelines for the Land Disposal of Solid Waste
      e. 40 CFR 257 Criteria for Classification of Solid Waste Disposal Facilities
      f. 40 CFR 763 Subpart E, Asbestos Containing Materials in Schools
      g. 40 CFR 763 Appendix C to Subpart E Asbestos Model Accreditation Plan
      h. EPA-560-OPTS-86-00 A Guide to Respiratory Protection for the AsbestosAbatement Industry
      i. EPA-560/5-85-024 Guidance for Controlling ACBM's in 1985)

   3. U.S. Department of Transportation
      a. 49 CFR 173.1090 Shippers - General Requirements for Shipments and Packaging
      b. 49 CFR 177.844 Carriage by Public Highway

   4. American National Standards Institute (ANSI)
      a. Z9.2-79 Fundamentals Governing the Design and Operation of Local Exhaust Systems
      b. Z88.2-80 Practices for Respiratory Protection

   5. American Society for Testing Materials (ASTM)
      a. E-849-82: Safety and Health Requirements Relating to Occupational Exposure to Asbestos

b. P-189: Specification for Encapsulants for Friable Asbestos-Containing Building Materials

6. National Fire Protection Association (NFPA)
   a. Standard 90A Installation of Air Conditioning and Ventilation Systems

7. National Institute of Occupational Safety and Health (NIOSH)
   a. Manual of Analytical Physical and Chemical Analysis Method (P&CAM) Methods, 2nd Edition, Vol. I,
   b. Method 7400 Fibers (N1, 3rd Edition, Vol. I)

8. Underwriters Laboratories, Inc. (UL)
   a. 586-77 (R-1982) Test Performance of High Efficiency, Particulate, Air Filter Units

1.5 SUBMITTALS - ASBESTOS ABATEMENT

A. Contractor Submittals (Following Award)
   1. Copy of current State of California, Contractor License
   2. Copy of current Contractor License to perform asbestos-related work in California
   3. Copies of current AHERA accreditation for all Asbestos Abatement Contractor, Abatement Contractor/Supervisor(s) and Asbestos Workers
   4. Copy of current registration with DOSH/Cal/OSHA for Asbestos Work in California
   5. Current copies of Medical Clearances (within last 12 months)
   6. Company Illness and Injury Prevention Plan
   7. Company Respiratory Protection Plan
   8. Copy of Standard Forms – Section 02 82 14

B. Representative and Warranties
   By submitting bid, Asbestos Abatement Contractor/bidder represents and warrants to County of Fresno that:

   1. Asbestos Abatement Contractor is completely familiar with all applicable laws, regulations and guidelines of the varying jurisdictions in which the work is to be done.

   2. Asbestos Abatement Contractor and the Contractor shall protect and keep County of Fresno, their agents and employees of T. Brooks & Assoicates a Divison of Provost and Pritchard, harmless and free from all liability, penalties, fines, losses, damages, costs, expenses, causes of action, claims or judgement resulting from injury, harm or exposure in any manner to asbestos, asbestos-containing materials, fibrous asbestos and airborne asbestos fibers, to any persons or property arising out of or in any way connected with the performance of work under this Contract, and shall indemnify said parties from any claims, suits or actions therefrom, including attorney's fees.

   3. The Contractor shall further hold harmless County of Fresno, their agents and employees of T. Brooks & Assoicates a Divison of Provost and Pritchard free from liability or claims for any injuries to a death of Contractor's or subcontractor's employees resulting from any cause whatsoever, and shall indemnify same from any costs, expenses or judgements (including attorney's fees) paid or incurred on that behalf.

4. The Contractor shall dispose of asbestos-containing materials in an landfill which is licensed to accept abestos waste. Each landfill shall indemnify, defend and hold harmless County of Fresno against all liabilities arising as a result of the landfill becoming subject to removal or remedial actions under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 USC § 9600 et seq., or comparable state law.

5. Asbestos Abatement Contractor shall be experienced in performing the asbestos abatement work associated with the project. At the request of County of Fresno, the Contractor shall provide documentation of relevant experience and references.

6. Asbestos Abatement Contractor and Contractor shall demonstrate that they have sufficient personnel resources to successfully complete the work under this project. Asbestos Abatement Contractor and Contractor shall use only qualified subcontractors and that all subcontractors will be under bidder's control at all times in regards to quantity and quality of employees, methods and materials and that the Asbestos Abatement Contractor and Contractor shall retain responsibility for all work of subcontractors within the limits required by law.

C. Submittals Prior to Start of Work
   1. Proof of Notification in the form of copies of documents submitted to:
      a. California Division of Occupational Safety and Health (Asbestos Notification)
      b. California Division of Occupational Safety and Health (Lead Notification)
      c. EPA, Region IX, NESHAP (if required)
      d. San Joaquin Valley Air Pollution Control District (Central Region Office)

   2. Asbestos Contractor Information Detail — Section 02 82 14
      a. Emergency Information — (On Contractor Letterhead)
      b. Authorized Project Personnel — Section 02 82 14
      c. Medical Testing Certification — Section 02 82 14
      d. Respirator Fit Test Certification — Section 02 82 14
      e. Certificate of Worker's Acknowledgment — Section 02 82 14
      f. Asbestos Waste Disposal Site — Section 02 82 14

   3. Contractor shall provide all required completed Standard Forms in submittal binders and equivalent to number of required submittals as required by primary design professional.

   4. Provide Project Schedule for all abatement related work as required in Project General Conditions. Schedule shall indicate Set-up, Abatement, and Clearance Phases).

   5. List of all abatement personnel, including full name, date of birth, and SSN assigned to this project.
      a. "Competent Person" as required by 8 CCR 1529
         i. Asbestos-Specific Training
         ii. Experience
         iii. Medical Testing
         iv. Respirator Fit-Testing
         v. AHERA accreditation
         vi. Employee Release Form

6. For each employee who will work or enter any “Regulated Area”:
    i. Asbestos-Specific Training
    ii. Experience
    iii. Medical Testing
    iv. Respirator Fit-Testing
    v. AHERA accreditation
    vi. Employee Release Form

7. Emergency Information (on Asbestos Abatement Contractor Letterhead)

8. Name, location and EPA designation of Waste Disposal Site

9. Name, address and EPA registration of Hazardous Waste Hauler

10. Subcontractor(s) License(s) if required

11. MSDS sheets for any materials which require them.

12. Description or drawings of:
    a. Abatement area
    b. Negative Air system, including number, placement of units and location of exhaust ports to outside the work area
    c. Decontamination area
    d. Waste pass-out area
    e. Emergency Exit(s)
    f. Location of dumpsters or containers

13. Manufacturers’ Data or Technical Data Sheets, including any required testing for:
    a. Respirators
    b. Negative Air System Components
    c. HEPA Vacuums
    d. Waste Water Filtration System
    e. Compressed Air System (if applicable)
    f. Encapsulant(s)
    g. Refinish materials (if applicable)

14. Submittals - Products
    a. Contractor shall provide required “submittals” in electronic format including a Table of Contents listing the elements contained in each section.

    b. Required submittals: Contractor shall provide a complete list of all products proposed for use on the project in the form of a project submittal. Prepare a complete list indicating each product listed. Include the manufacturer's name and proprietary product names for each item listed. Include product data sheetson each product.

    c. Form: Prepare the product listing schedule with information on each item tabulated under the following column headings:
        1. Related Specification Section number.
        2. Generic name used in Contract Documents.
        3. Proprietary name, model number and similar designations.
        4. Manufacturer’s name and address.
        5. Suppliers name and address.

6. Installer's name and address. Projected delivery date, or time span of delivery period.

15. Negative Exposure Assessment/Exposure Assessment
    a. Asbestos Abatement Contractor shall submit a copy of any proposed "Negative Exposure Assessment" or "Exposure Assessment" for review by County of Fresno's Designated Representative in the selection of the appropriate respiratory protection as required by 8 CCR 1529. Failure to submit data, or incomlete data shall mandate use of level of respiratory protection as required by applicable regulations, until such time as appropriate data is generated any approved by the APM.

D. Submittals During Project
   1. Daily Entry/Exit Log
   2. Abatement Contractor Daily Logs
   3. Analytical results of air samples taken to comply with 8 CCR 1529. Provide within 48 hours of shift during which samples were collected.
   4. Notification of any changes in personnel, resources or schedule.
   5. Notification of any injury or accident to employees or others when due work in progress.
   6. Hazardous Waste Manifests

E. Submittals At Conclusion of Project
   1. Copies of remaining entry/exit logs
   2. Notes or logs kept by job foreman/supervisor
   3. Hazardous Waste Manifests

1.6 ASBESTOS ABATEMENT - CONTRACTOR PERSONNEL

A. General
   1. Asbestos Abatement Contractor's employees assigned to this project shall be adequately trained and experienced to perform the work in a manner commensurate with all applicable codes, these specifications, and good standards of industry practice.

   2. The Contractor and the Asbestos Abatement Contractor shall be responsible to County of Fresno for the acts and omissions of Asbestos Abatement Contractor's employees, subcontractors and their agents and employees and other persons performing any of the work under the supervision or direction of the Asbestos Abatement Contractor.

   3. Asbestos Abatement Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the work any unfit person or anyone not skilled in the task assigned.

   4. Asbestos Abatement Contractor shall employ a competent superintendent who oversees work in conjunction with this project. The superintendent shall represent Asbestos Abatement Contractor and all communications given to the superintendent shall be considered binding as if given to the Asbestos Abatement Contractor. Superintendent shall be present at all scheduled job progress meetings, or unscheduled meetings when reasonable notice is given.

B. Training

1. Asbestos Abatement Contractor shall ensure that all of its employees who will contact or disturb asbestos-containing or asbestos contaminated materials for abatement and auxiliary purposes, and all supervisory personnel who may be involved in planning, execution or inspection of abatement projects have the required training and appropriate certification. Training shall comply with 8 CCR 1529, based on the appropriate OSHA work category.

2. Training shall provide, at a minimum, information on the following topics:
   a. The health hazards of asbestos including the nature of various asbestos related diseases, routes of exposure, known dose-response relationships, the synergistic relationship between asbestos exposure and cigarette smoking, latency periods for disease and health basis for standards.

   b. The physical characteristics of asbestos including fiber size, aerodynamic properties, physical appearance, and uses.

   c. Employee personal protective equipment including the types and characteristics of respirator classes, limitations of respirators, proper selection, inspection, donning, use, maintenance and storage of respirators, field testing the face-piece-to-face seal (positive and negative pressure fitting tests), qualitative and quantitative fit testing procedures, variations between laboratory and field fit factors, factors that affect respirator fit (e.g. facial hair), selection and use of disposable clothing, use and handling of launderable clothing, non-skid shoes, gloves, eye protection and hardhats.

   d. Medical monitoring requirements for workers including required and recommended tests, reasons for medical monitoring and employee access to records.

   e. Air monitoring procedures and requirements for workers including description of equipment and procedures, reasons for monitoring, types of samples and current standards with recommended changes.

   f. Work practices for asbestos abatement including purpose, proper construction and maintenance of air-tight plastic barriers, job set-up of airlocks, worker decontamination systems and waste transfer airlocks, posting of warning signs, engineering controls, electrical and ventilation system lockout, proper working techniques, waste clean-up and storage and disposal procedures.

   g. Personal hygiene including entry and exit procedures for the work area, use of showers, and prohibition of eating, drinking, smoking and chewing in the work area.

   h. Special safety hazards that may be encountered including electrical hazards, air contaminants, encapsulants, materials from County of Fresno operation, fire and explosion hazards, scaffold and ladder hazards, slippery surfaces, confined spaces, heat stress and noise. Contractor shall take all steps necessary to protect employees from potential hazards.

   i. Supervisory personnel shall, in addition, receive training in contract specifications, liability insurance and bonding, legal considerations related to abatement, establishing respiratory protection medical surveillance programs,

EPA, OSHA and State record keeping requirements, and specific instructions pertaining to the performance of this project.

3. Required asbestos training must be current (within the last twelve months) for the duration of the project. Any employee whose training expires shall not work on the jobsite until such time as a current certificate is provided.

C. Medical Monitoring
1. Medical Monitoring must be provided in accordance with Title 8 CCR 1529, including mandatory appendices.

2. Asbestos Abatement Contractor shall document that all abatement workers have successfully passed medical examinations as required by OSHA regulations in order to wear a respirator.

1.7 TEMPORARY FACILITIES AND CONTROLS - ASBESTOS ABATEMENT

A. Temporary Facilities
1. Contractor to provide any temporary office for use by its personnel. Contractor shall be responsible for connection of electricity, plumbing, or telephone service it requires.

2. Provide “lockable” containers at the site for the storage of tools and materials used in asbestos abatement. Contractor shall be responsible for security of container and any equipment maintained on project site.

3. Contractor will provide portable restroom facilities for use by its workers and site personnel at the project location in the event onsite restroom facilities are not approved for use by the County of Fremso . Contractor shall maintain facilities in clean condition.

B. Water for Construction
1. The Asbestos Abatement Contractor may utilize water available on the subject property as long as it is from a source under the authority County of Fresno. If water is not available at the site, or water needs go beyond what is available at the subject property, Contractor shall supply water from outside source and shall include cost for water, including delivery and storage in their bid for the work.

C. Electricity
1. Asbestos Abatement Contractor shall provide portable electrical generator as required for all aspects of the work to operate power tools and equipment necessary or required to complete the work under the Agreement beyond what is available at the site. Contractor shall include cost to provide temporary electrical power in their bid for the work if power is not available at site, or is inadquate based on project needs.

2. All circuits within containment areas shall be locked out to prevent possible electrical shock during wet operations. Electrical power sources shall be located outside of work areas.

D. Handling Material
1. The Asbestos Abatement Contractor shall properly care for and protect materials and equipment at the site. Placement of building materials and equipment at the site

shall be subject to the approval of County of Fresno.

2. The Asbestos Abatement Contractor shall keep the work area clean to the satisfaction of the County of Fresno and its Representative, and prevent disturbance or debris from the work at all times and prevent release of asbestos from the work area adjacent to areas or portions of the building or building exterior.

3. Upon completion of the work per work area and at completion of all work, leave grounds in a neat and clean condition and asbestos free.

E. Cleaning
1. The Asbestos Abatement Contractor shall keep the work area clean to the satisfaction of the County of Fresno, and shall prevent disturbance of occupants in adjacent structures, and shall remove accumulated debris from the work at all times and prevent release of asbestos from the work area adjacent to areas or portions of the building or building exterior.

2. Upon completion of the work work area per day and at completion of all work, leave grounds in a neat and clean condition and asbestos debris.

F. Hoist and Temporary Elevators (Where Applicable)
1. The Asbestos Abatement Contractor shall install and operate hoist and elevators as required for proper execution of the work and obtain permits, in compliance with all Applicable Laws.

G. Barricades and Walkways
1. Maintain at all times adequate barricades or enclosed walkways to satisfaction of the County of Fresno, to protect the workmen, and the public from injury and prevent access to the work areas to the satisfaction of County of Fresno.

H. Advertisement Signs
1. Advertisement signs may not be displayed on the property unless approved by the County of Fresno.

I. Inspection and Testing
1. Inspection Agency: An independent testing laboratory selected by County of Fresno shall perform any specified testing and laboratory analysis.

2. Payment of Testing: Testing laboratory charges for work performed by County of Fresno's Designated Representative will be paid by County of Fresno, except as otherwise identified in this specification, and shall not be included as part of the contract.

3. Payment of Re-Testing: Should the results of the laboratory test indicate that the material or workmanship fails to comply with requirements of the specifications, the work shall be redone at the Asbestos Abatement Contractor's expense until it does satisfy the requirements. The final results shall be verified as acceptable by laboratory tests which shall be paid by the Asbestos Abatement Contractor, at his expense.

J. Employee Conduct
1. The Asbestos Abatement Contractor shall be responsible for ensuring that it's employees comply with all Applicable Laws and perform work in a safe manner. Any

employees entering the work area under the influence of alcohol or drugs shall be immediately removed by the Asbestos Abatement Contractor from the job site. In the event there is any question whether said employee is under the influence of alcohol or drugs, the Asbestos Abatement Contractor shall temporarily remove said employee from the job site until the question is resolved by the Asbestos Abatement Contractor and County of Fresno.

PART 2 – PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS - ASBESTOS ABATEMENT

A. General
   1. The Contract is based on the materials, equipment and methods described in the Contract Documents.

   2. Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and brand name.

   3. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Replacement materials shall be stored outside of the work area until abatement is completed.

   4. Damaged, deteriorating or previously used materials shall not be used and shall be removed from the work-site and disposed of properly.

B. Unavailability of Materials
   1. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the work.

   2. In the event that specified items will not be so available, Contractor may submit, in writing, substitute materials of equal quality for approval by County of Fresno's Designated Representative. Substitute materials are not to be considered equal until approved in writing by County of Fresno's Designated Representative.

   3. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Asbestos Abatement Contractor, will be back-charged as necessary and shall not be borne by County of Fresno.

C. County of Fresno's Designated Representative for Asbestos Related Work:
   1. County of Fresno's Designated Representative will respond in writing to the Asbestos Abatement Contractor within seven (7) calendar days of receipt of the completed product list schedule. No response within this time period constitutes no objection to listed manufacturers or products, but does not constitute a waiver of the requirement that products comply with Contract Documents. County of Fresno's Designated Representative will include a list of unacceptable product selections, containing a brief explanation for this action.

D. Quality Assurance
   1. Compatibility of Options: When the Asbestos Abatement Contractor is given the option of selecting between two or more products for use on the project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

E. Product, Deliver, Storage, and Handling
   1. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

   2. Schedule delivery to minimize long-term storage at the site and overcrowding of construction spaces.

   3. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

   4. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protection and installing.

   5. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected..

   6. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

   7. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

   8. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation.

   9. Maintain temperature and humidity within range required by manufacturer's instructions.

2.2 PRODUCT SELECTION

A. Standard Products: Where available, provide standard products of types that have been used successfully in similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous project experience. Procedures governing product selection include the following:
   1. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Asbestos Abatement Contractor to use of these products only, the Asbestos Abatement Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions governing "substitutions" to obtain approval for the use of an unnamed product.
   2. Descriptive specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
   3. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall Performance of a product is implied where the product is

specified for a specific application.

4. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
5. Compliance with Standards, Codes, and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
6. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division-1 for allowances that control product selections, and for procedures required for processing such selections.

C. Materials
   1. Material Safety Data Sheet (MSDS) will be submitted for each product or material to be used in conjunction with the work.
   2. Wetting Agent: The wetting agent shall be BWE 5000 manufactured by Better Working Environments, Inc. of San Diego, CA, or approved equivalent.
   3. Surfactant: (wetting agent shall be a 50/50 mixture of polyoxethylene ether and polyoxethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to .5 gallons of water or as specified by manufacturer.
      a. Reference Materials: Aqua-Gro or equal.
      b. As an alternate to these surfactants, specialized removal materials may also be used:
   4. Reference Materials: BWE500 (Better Working Environments, Las Vegas, Nevada) or EPA-55 (American Coatings Corporation, Niles IL).
   5. Encapsulant(s): Encapsulant used to reseal surfaces from which asbestos has been removed and to “lock-down” all remaining microscopic asbestos-containing particulate. Material shall be compatible with intended use, operating characteristics and environmental conditions.
      a. Encapsulants should not be solvent-based or utilize a vehicle consisting of hydrocarbons.
      b. Reference Materials: Foster’s 22-P or Cable Coat 2-B (American Coatings Corporation, Niles, Il) or BWE 3000 (Better Working Environments, Las Vegas, Nevada) or equivelant.
      c. Encapsulants shall be of the bridging or penetrating variety.
      d. Factory mutual approval for Class A construction
      e. Underwriter Laboratory approval for Class A
      f. Flame Spread Class A - 0 to 2
      g. Encapsulating Material: Encapsulation material shall provide penetrating or bridging characteristics adequate to protect against fiber release and shall have been tested by methods compatible with those used by Battelle Laboratories Protocol.
         i. Foster’s as manufactured by H.B. Fuller Co. of Houston, Penetrating Encapsulant: No. 207 Special Sealer No. 33775-2-7A, Makus-Cincinnatus Inc.; or approved equal.
         ii. Bridging Encapsulant: Pentagon Plastics Inc., or approved equal.
         iii. Fibercote manufactured by Northwest Coating, Inc., Edmonds, WA, or approved equal.

D. Sealants: Select from the following or their equivalent if approved for use on the project. All materials should be field tested and used according to the manufacturers’ specifications.
   1. No. 207 Special Sealer No. 33775-27A as manufactured by Makus-Cincinnatus, Inc., distributed by Northwest Coatings, Inc., P.O. Box 635, Edmonds, WA 98020, Telephone (206) 778-5644. (Application rate as recommended by manufacturer, or

approved equal.)

2. "Asbestos 2000," Arpin Products, Inc., P.O. Box 262, Oak Hurst, MJ 07755, Telephone (202) 531-0674. (Application rate as recommended by manufacturer, or approved equal.)
3. "Wedbestos Sealer," Webco Products, Stinnes Western Chemical, 3270 East Washington Blvd., Los Angeles, CA 90023, Telephone (213) 269-0191. (Application rate as recommended by manufacturer, or approved equal.)
4. "Dust-Set," Mateson Chemical Corp., 1025 E. Montgomery Ave., Philadelphia, PA 19125, Telephone (215) 423-3200. (Application rate as recommended by manufacturer, or approved equal.)
5. "Fibersele," penetrating sealant manufactured by Northwest Coatings, Inc., Edmonds, WA 98020, Telephone (206) 778-5644. (Application rate as recommended by manufacturer, or approved equal.)
6. Tape or Spray Adhesive: Tape or Spray Adhesive shall be capable of sealing joints of adjacent plastic sheets and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and of adhering under dry and wet conditions, including use of amended water.
7. Plastic Sheet: All plastic sheeting must be minimum six mil. and fire retardant and shall be polyethylene material sized in lengths and widths to minimize the frequency of joints. All critical barriers shall consist of min. six (6) mil. polyethylene film.
8. Lumber/Wood: All wood used in the construction of the enclosure/decontamination system must be a treated fire retardant type.
9. Plastic Bags: Plastic bags shall be a minimum six mil. clear polyethylene printed with warning labels per OSHA and EPA regulations.
10. Glove Bags: Glove bags shall be a minimum of six mil. PVC and specially designed for removal of asbestos-bearing insulation.
11. Asbestos Free Labels: Post abatement areas from which asbestos was removed will be labeled with Company supplied "NO ASBESTOS" labels.
12. All unused products shall remain the property of the Asbestos Abatement Contractor and shall be removed from the project site before completion of the project.

E. Execution
   1. Installation of Products
      a. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located, and aligned with other work.
      b. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion

2.3 WORK AREA CLEARANCE - ASBESTOS ABATEMENT

A. General Related Documents
   1. Project construction drawings and general provisions of Contract, including General and Supplementary Conditions and other Specification Sections, apply to work of this section.

   2. **Visual Inspection**: Required as a prerequisite of final air testing per containment area. Requires use of "Certificate of Visual Inspection" to be signed by representative of Asbestos Abatement Contractor and APM.

   3. **Air Monitoring:** TEM Final Air Clearances per 40 CFR, 763, subpart E will be required per containment area.

B. Visual Inspection
   1. Work of this Section will not begin until the visual inspection, per containment area, described in enclosed "Inspections and Testing" section is complete and has been approved by County of Fresno's Designated Representative.

C. County of Fresno's Designated Representative and These Specifications
   1. County of Fresno's Designated Representative will conduct air monitoring on behalf at discretion of County of Fresno on its behalf.

   2. County of Fresno's Designated Representative will conduct a final visual inspection within each containment area following completion of abatement operations as a condition of acceptance of work.

   3. County of Fresno's Designated Representative will conduct final air clearances per these specifications with analysis by TEM AHERA method within each containment area following completion of abatement operations as a condition of acceptance of work.

   4. Contractor shall not request an extension of the Contract based on delays associated with their failure to determine the scope of work involving abatement operations, additional abatement work, or additional Final Air Clearances necessitated by failure of Contractors to successfully pass the initial Final Air Clearance.

   5. Asbestos Abatement Contractor shall be responsible for all costs associated with supplemental visual clearances in the event the initial visual clearance fails as determined by the County of Fresno's Asbestos Consultant and the County of Fresno.

D. Testing Costs
   1. Asbestos Abatement Contractor's air sampling and laboratory analysis shall be paid by the Asbestos Abatement Contractor and shall be included in their bid for the work.

   2. County of Fresno shall pay for all inspections and sampling done at its request unless such costs are otherwise provided for in the contract, including perimeter air sampling.

   3. Contractor shall not request an extension of the Contract based on delays associated with their failure to determine the scope of work involving abatement operations, additional abatement work necessitated by failure of Contractors to successfully pass any Visual Clearance.

E. Release Criteria: Abatement related work is complete if the following conditions are met:
   1. County of Fresno's Designated Representative shall upon notice that specified abatement operations are complete (per containment area) conduct an on-site visual inspection to ensure that the abatement work has been completed in accordance with these specifications.

   2. Upon satisfactorily passing the visual inspection and acceptance of work by County of Fresno, Contractor may commence Renovation phase of project.

   3. If the visual inspection does not successfully pass as determined by the County of

Fresno's Representative, the Contractor shall conduct additional abatement, decontamination, and/or cleaning to satisfaction of County of Fresno's Representative. Upon completion of additional work, visual inspections shall be repeated until County of Fresno and County of Fresno's Representative are satisfied that work has been completed satisfactorily and completely. Contractor shall be responsible for all costs associated with additional visual clearance related events based on failure to successfully meet visual inspection for each containment.

PART 3 - EXECUTION

3.1 ASBESTOS ABATEMENT: GENERAL

A. General

1. Asbestos Abatement Contractor shall supply all labor, materials, equipment, insurance and disposal to remove ACBM's as indicated in this Specification. Contractor shall refer to project construction drawings, specification sections and all design documents to determine work that may involve disturbance of asbestos and lead containing materials.

2. Asbestos Abatement Contractor shall be Certified for Asbestos Work by the California State Contractor's Licensing Board.

3. Each employee of Asbestos Abatement Contractor assigned to this work shall be trained in accordance with the requirements of Title 8 CCR 1529. At least one employee on each shift shall have successfully completed current refresher training meeting the requirements for "Competent Person" (Title 8 CCR 1529).

4. All work shall be done in accordance with applicable regulations, including, but not limited to: 29 CFR 1926.1101(Federal OSHA), Title 8 CCR 1529 (Cal-OSHA), 40 CFR Part 61 (NESHAPS), including mandatory and non-mandatory appendices as applicable.

5. Asbestos Abatement Contractor shall make all necessary notifications according to the form, content and schedule required by applicable laws and regulations.

B. General Parameters

1. Asbestos Abatement Contractor shall remove all asbestos-containing material as indicated in Sub-Section 1.1 (Summary of Scope of Work - Asbestos Abatement) of these specifications, and as required to complete scope of work, and authorized change orders.

2. Asbestos Abatement Contractor shall review all project construction drawings and, asbestos survey report, and specifications regarding scope of work to determine locations where ACBM's are present which are to be removed in order to complete the scope of work. Contractor shall not request or be awarded additional compensation for work due to their failure to adequately determine the scope of abatement work based upon review of all pertinent design documents and field verification of existing condition effecting completion of the work.

3. Asbestos Abatement Contractor shall protect all employees of County of Fresno, and others from inhaling asbestos fibers in excess of the levels established for the given area in which the personnel are located and OSHA regulations. Asbestos

Abatement Contractor shall take measures to maintain airborne levels below required levels as may be verified by perimeter air sampling operations conducted by County of Fresno's Designated Representative.

4. Asbestos Abatement Contractor shall, during the abatement of ACM, prevent asbestos fiber contamination of any area outside any regulated area as herein defined. Asbestos Abatement Contractor shall erect and maintain negative pressure enclosure(s), and critical barriers to preclude migration of airborne fibers outside the containment area. Compliance with this requirement shall be verified by perimeter air monitoring , visual determination, and recording manometer.

5. Asbestos Abatement Contractor shall, during work, limit entry into the work area only to authorized employees and visitors wearing appropriate respiratory protection. Employees may be required to obtain and display a temporary identification badge authorizing entry into the facility. Authorized employees and visitors shall include:

    a. Asbestos Abatement Contractor's employees listed in job submittals
    b. Asbestos Abatement Contractor's authorized supervisory personnel
    c. County of Fresno's Designated Representatives
    d. Employees of agencies having jurisdiction over the work
    e. Authorized employees of County of Fresno

6. Asbestos Abatement Contractor shall ensure and document that all asbestos-containing waste has been disposed of in accordance with applicable federal, state and local laws.

7. Asbestos Abatement Contractor shall document that all activities are/were in accord with the Project Specifications, the Project Contract Documents and all applicable laws and regulations governing abatement of ACBM's.

8. In addition to special precautions required during asbestos abatement, Asbestos Abatement Contractor shall provide a safe working environment and personal protective devices for Asbestos Abatement Contractor's employees and any authorized visitors.

9. Asbestos Abatement Contractor shall pursue work with all due diligence.

10. Asbestos Abatement Contractor shall not cease working on this project except at times specified in the project calendar or without prior notification and approval of County of Fresno and its Representative.

11. Asbestos Abatement Contractor shall not change or substitute the Asbestos Abatement Contractor Supervisor (Project Foreman) without prior notification and approval of County of Fresno's Designated Representative.

C. Extra Work

1. The Asbestos Abatement Contractor warrants that he/she has become fully familiar with the work including but not limited to the quantities, locations, and types of asbestos containing materials to be abated.

2. "Extra Work" may only be authorized by County of Fresno, in writing. Any additional work performed which County of Fresno has not approved in writing shall not be the

responsibility of the County of Fresno and the Contractor shall not request compensation.

3. County of Fresno's Designated Representative shall approve in writing all additional, unforseen abatement work necessitating a change in contract price. Costs for such work shall be agreed upon by Contractor and County of Fresno prior to initiating work effecting such materials. Negotiated costs shall be all inclusive and shall reflect all costs including labor, materials, insurance, disposal, overhead and profit, etc. and shall be in accordance with project provisions for "change orders".

D. Stop Work Orders

1. County of Fresno or its Representative may issue a STOP WORK order and suspend work in whole or in part, when in the opinion of County of Fresno, the suspension is necessary or in its best interest.

2. County of Fresno's Designated Representative may issue a STOP WORK order whenever the Asbestos Abatement Contractor's work or protective measures are not in accordance with the Specifications or applicable rules and regulations.

3. Any breach in isolation between the regulated area and adjacent areas shall be sufficient reason to issue a STOP WORK order.

4. Air sampling inside the work area which results in fiber counts in excess of 0.1 f/cc or 1.0% of the rated protection limit of other respiratory protection in use at the time of sampling shall be sufficient reason to issue a STOP WORK order.

5. Excess ACM debris, visible emissions, or insufficient wetting of ACM may result in a STOP WORK order.

6. Complaints from building occupants located in adjacent areas may result in a temporary STOP WORK order. If such complaints are not the result of Asbestos Abatement Contractor's failure to observe or comply with the Specifications or regulations, time lost on the project shall be added to project time period.

7. Visible debris outside the work area shall be sufficient reason to issue a STOP WORK order.

8. Upon issuance of a STOP WORK order, abatement work shall not resume until current respiratory protection, and methods and procedures utilized by the Asbestos Abatement Contractor have been evaluated and necessary steps taken to reduce airborne levels below stipulated levels to satisfaction of County of Fresno's Designated Representative.

3.2 SITE PREPARATION - ASBESTOS ABATEMENT

A. General

1. The "Work Area", including regulated areas, equipment staging areas, and other areas set aside for the use of the Asbestos Abatement Contractor, are at all times during this project the responsibility of the Asbestos Abatement Contractor. Contractor shall maintain areas in clean condition to the satisfaction of County of Fresno's Designated Representative.

2. Asbestos Abatement Contractor has the right and obligation to control access to restricted work areas. Employees of County of Fresno may be required to access certain areas during the project for the purposes of servicing or maintaining equipment and for emergencies.Contractor shall provide reasonable access to such personnel and shall maintain two (2) clean and properly functioning PAPR respirators and protective coveralls at the jobsite for use by such persons.

B. Signs and Barriers
   1. Perimeter barriers shall be installed around each work area and other areas used by Asbestos Abatement Contractor for storage, disposal or equipment.

   2. At each access to the regulated area Asbestos Abatement Contractor shall install warning signs meeting the requirements of Title 8 CCR 1529 and 40 CFR 763, subpart E.

C. Security
   1. Asbestos Abatement Contractor shall be responsible for security of Asbestos Abatement Contractor's work area, material, equipment and supplies.

   2. Unless otherwise agreed to in writing, County of Fresno accepts no responsibility for loss of Asbestos Abatement Contractor's equipment or materials maintained at the project site.

   3. Asbestos Abatement Contractor shall notify local fire department of the asbestos abatement project and effective dates.

3.3 WORK AREA PREPARATION - ASBESTOS ABATEMENT

A. General
   1. Asbestos Abatement Contractor shall post caution signs meeting the specifications of Title 8 CCR 1529 at any location and approaches to a location where airborne concentrations of asbestos may exceed the "Permissible Exposure Limit".

   2. Asbestos Abatement Contractor shall determine whether building electrical power or temporary power supply is necessary. All circuits feeding the work area shall be locked out and tagged. Electrical power shall be brought into the work area from circuits and sources outside the containment area. Electrical power beyond that readily at the site will be provided by the Asbestos Abatement Contractor at no additional cost to County of Fresno, including cost of providing temporary electrical power.

B. Emergency Exits
   1. Emergency exits shall be established and clearly marked with emergency exit signs complying with applicable fire codes, approved by County of Fresno and clearly marked with duct tape arrows, properly lighted, or other effective designations to permit easy location from anywhere within the work area.

   2. Emergency exits shall be secured to prevent access from uncontaminated areas and still permit emergency exiting.

   3. Emergency exits shall be properly sealed with polyethylene sheeting which can be cut to permit egress if needed.

C. Decontamination Area
   1. General Requirements
      a. Worker decontamination enclosure systems shall be provided at all locations where workers will enter or exit the work area.

      b. The worker decontamination enclosure system shall consist of at least a clean room, shower room and an equipment room, each separated form the other and from the work area by airlocks and must substantially conform to the requirements of Title 8 CCR 1529.

      c. Plans for construction, including materials and layout, shall be submitted to County of Fresno's Designated Representative as part of the submittal package. Worker decontamination enclosure systems constructed at the work-site shall utilize six (6) mil. polyethylene sheeting on sides or other acceptable materials for privacy, whenever visible outside of containment area. For commercial units, Asbestos Abatement Contractor shall submit manufacturer's data sheet.

      d. Entry to and exit from all airlocks and decontamination enclosure system chambers shall be through curtained doorways consisting of two sheets of overlapping polyethylene sheeting. Doorway designs with equivalent protection and acceptable to County of Fresno's Designated Representative may be utilized.

      e. Access between any two rooms in the decontamination enclosure system shall be through an airlock with at least 1 foot separating each curtained doorway. Pathways into (from clean to contaminated) and out from (contaminated to clean) the work area shall be clearly designated.

      f. The equipment room shall be used for storage of equipment and tools at the end of a shift after they have been decontaminated using a HEPA filtered vacuum and/or wet cleaning techniques as appropriate.

   2. Decontamination Area – Construction
      a. Construction, whether job-built or commercial, shall be of sturdy materials capable of withstanding the flow of person, equipment and material.
      b. In areas where no other security against entry can be provided, the outside door to the clean-room must be provided with a lock or other security device. Asbestos Abatement Contractor shall make provision for access into the work area by authorized representatives and visitors.
      c. Clean room shall be sized to adequately accommodate the work crew. If the clean room is not of sufficient size to contain storage lockers or bins for employee's clothing and respiratory equipment, such storage shall be provided in a secure area as close as possible to the entry to the clean room.
      d. Shower room shall contain one or more showers as necessary to adequately acommodate all workers.
      e. Showers shall be provided with hot and cold running water.
      f. Shower water shall be filtered through five (5) micron filter system prior to be disposed of in manner approved by County of Fresno.
      g. Equipment room shall be sized to permit both employee changes and storage of equipment and materials.

3.4 WORKER PROTECTION AND DECONTAMINATION - ASBESTOS ABATEMENT

A. General
   1. Asbestos Abatement Contractor shall provide for all employees appropriate personal protective gear and other necessary safety equipment.

   2. Personal protective gear and safety equipment shall be inspected before each use.

   3. In addition to requirements of this Section, Asbestos Abatement Contractor may be required to provide additional health and safety protection as required by County of Fresno or its Representative.

B. Asbestos Worker Training
   1. AHERA Accreditation: All workers are to be accredited as Abatement Workers as required by the AHERA regulation 40 CFR 763 Appendix C to Subpart E, April 30, 1987.

   2. State and Local License: All workers are to be trained, certified and accredited as required by state or local code or regulation.

   3. Train, in accordance with Title 8 CCR 1529 all workers in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. Include but do not limit the topics covered in the course to the following:
      a. Methods or recognizing asbestos
      b. Health effects associated with asbestos
      c. Relationship between smoking and asbestos in producing lung cancer
      d. Nature of operations that could result in exposure to asbestos

   4. Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:
      a. Engineering Controls
      b. Work Practices
      c. Respirators
      d. Housekeeping procedures
      e. Hygiene facilities
      f. Protective clothing
      g. Decontamination procedures
      h. Emergency procedures
      i. Waste disposal procedures
      j. Purpose, proper use, fitting, instructions and limitations of respirators as required by 29 CFR 1910.134.
      k. Appropriate work practices for the work
      l. Requirements of medical surveillance program
      m. Review of Title 8, CCR 1529 & 29 CFR 1926.1101
      n. Pressure Differential Systems
      o. Work practices including hands on or on-the-job training
      p. Personal Decontamination procedures
      q. Air monitoring, personal and area

C. Medical Examinations
   1. Provide medical examinations for all asbestos abatement workers who may encounter an airborne fiber level of 0.1 f/cc or greater for an eight (8) hour Time

Weighted Average. In the absence of specific airborne fiber data provide medical examinations for all workers who will enter the Work Area for any reason. Examination shall as a minimum meet OSHA requirements as set forth in Title 8 CCR 1529.

D. Respiratory Protection
   1. General
      a. Respiratory Protection Program: Comply with ANSI Z88.2 - 1980 “Practices for Respiratory Protection" and OSHA 29 CFR 1910.134 and 1926.103.
      b. Require that respiratory protection be used at all times that there is any possibility of disturbance of ACBM’s whether intentional or accidental.
      c. Require that a respirator be worn by anyone in a Work Area at all times, regardless of activity, during a period that starts with any operation which could cause cause airborne fibers until the area has been cleared for re-occupancy in accordance with enclosed Sub-Section 1.11.
      d. Regardless of Airborne Fiber Levels: Require that the minimum level of respiratory protection used for work involving friable materials be a half-face respirator with high efficiency filters (HEPA).

   2. Fit Testing
      a. Initial Fitting: Provide initial fitting of respiratory protection during a respiratory protection course of training set up and administered by a Certified Competent Person. Fit types of respirator to be actually worn by each individual. Allow an individual to use only those respirators for which training and fit testing has been provided.
      b. On a monthly basis, check the fit of each worker's respirator by having irritant smoke blown onto the respirator from a smoke tube.
      c. Upon Each Wearing: Require that each time an air-purifying respirator is put on it be “fit checked” with a positive and negative pressure fit test in accordance with the manufacturer's instructions or ANSI Z88.2 (1980) and 8 CCR 1529.

   3. Type of Respiratory Protection Required
      a. Provide Respiratory Protection as indicated in paragraph below. Where paragraph below does not apply, determine the proper level of protection by dividing the expected or actual airborne fiber count in the Work Area by the "protection factors" given below.
      b. The level or respiratory protection which supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the permissible exposure limit (PEL) is the minimum level of protection allowed.

E. Permissible Exposure Limit (PEL)
   8-Hour Time Weighted Average (TWA) and Ceiling Concentration of asbestos fibers to which any worker may be exposed shall not exceed the following:
   1. Fibers: For purpose of this section, fibers are defined as all fibers regardless of composition as counted in the OSHA Reference Method (ORM), or NIOSH 7400 procedure.
   2. 8-Hour Time Weighted Average (TWA) - □0.1 fibers/cubic centimeter.
   3. Excursion Monitoring: 30 minute PEL: <1.0 fibers/cubic centimeter.

F. Respiratory Protection Factor

Respirator Type	Protection Factor
Air Purifying: Negative pressure respirator High efficiency filter Half face piece	10
Air Purifying: Negative pressure respirator High efficiency filter Full face piece	50
Powered Air Purifying (PAPR): Positive pressure respirator High efficiency filter Half or Full face piece	50
Type C supplied air: Positive pressure respirator Pressure demand or other pressure positive mode Half face piece	1000
Type C supplied air: Positive pressure respirator Pressure demand or other positive pressure mode Full face piece	2000
Type C supplied air: Positive pressure respirator Pressure demand or other positive pressure code Full face piece equipped with an auxiliary positive pressure Self-contained breathing apparatus (SCBA)	10,000
Self-contained breathing apparatus (SCBA): Positive Pressure respirator Pressure demand or other positive pressure mode Full face piece	10,000

G. Asbestos Abatement Contractor shall provide respiratory protection for all employees who enter the regulated area anytime that one can reasonably expect that ACM will be disturbed or that anticipated airborne levels may exceed “0.01 f/cc”.

H. Level of Protection
   1. Respiratory protection shall be provided per 8 CCR 1529 requirements. The minimum protection required at any time within the regulated area for abatement of friable materials, regardless of fiber level, shall be 1/2-face, negative pressure, (P-

100-HEPA filtered respirators operated in positive pressure mode.

2. Type “C” air supplied respirators in positive pressure demand mode with full-face pieces and HEPA filtered disconnect protection are recommended by the U.S.EPA for all full shift abatement work until the successful completion of final clearance monitoring. The Contractor shall be prepared to provide Type "C" respiratory protection in those circumstances required by Cal/OSHA.

3. Compressed air systems, if used, shall be designed to provide air volumes and pressures to accommodate respirator manufacturer’s specifications. The compressed air systems shall have a receiver of adequate capacity to allow escape of all respirator wearers from contaminated areas in the event of compressor failure. Compressors must meet applicable Cal/OSHA requirements. Compressors must have an in-line carbon monoxide and periodic inspection of the carbon monoxide monitor must be evidenced. Documentation of adequacy of compressed air system/ respiratory protection system must be retained on site. This documentation will include a list of compatible components with the maximum number and type of respirators that may be used with the system. Periodic testing of compressed air shall insure that systems provide air of sufficient quality (Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1).

4. Appropriate minimum respiratory protection utilized by Asbestos Abatement Contractor shall be based upon submission and acceptance of “Negative Exposure Assessment” and/or “Exposure Assessment by Asbestos Abatement Contractor. Failure to provide “NEA” or “EA” will result in mandatory respiratory protection as required by OSHA until such time as “NEA” is established.

I. Other Personal Protection
   1. Full body disposable protective clothing, including head, body, and foot coverings consisting of materials impenetrable by asbestos fibers (Tyvek (R) or equivalent) shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.

   2. Disposable clothing shall be worn inside the regulated area any time one can reasonably expect that ACM will be disturbed.

   3. Rips or tears in disposable clothing shall be repaired immediately as required by Title 8 CCR 1529.

   4. New disposable clothing must be used for each entry into the regulated area.

   5. Disposable clothing must be removed in the equipment room before each exit from the regulated area.

   6. Eye protection meeting the requirements of ANSI Standard Z87.1-1979, safety shoes meeting the requirements of ANSI Standard Z41.1-1967, disposal PVC gloves), as necessary, shall be provided to all workers and authorized visitors.

   7. Non-skid footwear shall be provided to all abatement workers. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

3.5 ENTRY AND EXIT PROCEDURES – REGULATED AREA

A. General

1. All workers and authorized personnel shall enter the work area through the worker decontamination enclosure system.

2. All personnel, shall read and be familiar with all posted regulations, personal protection requirements (including workplace entry and exit procedures) and emergency procedures. A sign-off sheet shall be used to acknowledge that these have been reviewed and understood by all personnel prior to entry.

3. All personnel who enter and leave the regulated area must sign the entry/exit log, located outside or in the clean room.

B. Entry

1 All personnel shall proceed first to the clean room, remove street clothes and appropriately don respiratory protection (as deemed adequate for the job conditions) and launderable and/or disposable coveralls, head covering and foot covering. Hard hats, eye protection and gloves shall also be utilized if required by work conditions. Clean respirator and protective clothing shall be provided and utilized by each person for each separate entry into the work area.

2. Personnel wearing designated personal protective equipment shall proceed from the clean room through the shower room and equipment room to the main work area.

C. Exit

1. Before leaving the work area all personnel shall remove surface contamination from the outside of respirators and protective clothing by brushing and/or wet wiping procedures. Each person shall clean bottoms of protective footwear in the walk-off pan just prior to entering the equipment room.

2. Personnel shall proceed to equipment room where they remove all protective equipment except respirators. Deposit disposable [and launderable] clothing into appropriately labeled containers for disposal.

3. Reusable, contaminated footwear, hard hats and similar gear shall be stored in the equipment room when not in use in the work area. Upon completion of abatement it shall be decontaminated or disposed of as asbestos contaminated waste.

4. Still wearing respirators, personnel shall proceed to the shower area, clean the outside of the respirators and the exposed face area under running water prior to removal or respirator then shower and shampoo to remove residual asbestos contamination. Various types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered may be disconnected in the equipment room and worn in the shower. A powered air-purifying respirator face piece will have to be disconnected from the filter/power pack assembly which is not waterproof, upon entering the shower. A dual cartridge respirator may be worn into the shower. Cartridges must be replaced for each new entry into the work area.

5. After showering and drying off, employees shall proceed to the clean room and don clean disposable clothing if there will be later re-entry into the work area or street clothes.

3.6 HYGIENE

A. Asbestos Abatement Contractor shall provide sanitary facilities and toilets as close as possible to the entry of the regulated area.
B. No eating, smoking, chewing or drinking shall be permitted in the regulated or decontamination areas.

3.7 DEBRIS AND DECONTAMINATION - ASBESTOS ABATEMENT

A. General
   1. Asbestos Abatement Contractor shall remove all visible asbestos-containing debris prior to any work which would disturb the debris or cause it to become airborne.

   2. Debris may be wet wiped or HEPA vacuumed.

B. Moveable Equipment and Materials
   1. These instructions apply to County of Fresno's Designated Representatives equipment and materials.

   2. Moveable equipment and materials upon which there is evidence of asbestos-containing debris shall be cleaned before being moved from the regulated area. Asbestos Abatement Contractor shall be responsible to move all furnishings, equipment, or fixtures as necessary to complete scope of work. Asbestos Abatement Contractor personnel are not to unplug any operating systems or equipment without approval of County of Fresno.

3.8 DISPOSAL - ASBESTOS ABATEMENT

A. General
   1. This sub-section describes the disposal of Regulated ACBM's (RACM). Disposal includes packaging of asbestos-containing waste materials. Disposal shall be at an approved landfill licensed to accept regulated, asbestos-containing waste.

   2. Asbestos Abatement Contractor shall be responsible for ascertaining current applicable regulations for handling, transportation and disposal in the jurisdiction in which the work takes place.

   3. All disposal shall be in accordance with applicable regulations of the U.S. EPA, U.S. DOT, California DHS and the local AQMD/APCD.

   4. As the work progresses, to prevent exceeding available storage capacity on site, sealed and labeled containers of asbestos-containing waste shall be removed and transported to the prearranged disposal location.

   5. Disposal must occur at an authorized site in accordance with regulatory requirements of NESHAP and applicable State and Local guidelines and regulations, including the California State Department of Health Services, Toxic Substances Control Division.

   6. Contractor shall utilize and provide a "Hazardous Waste Manifest for each shipment of waste defined by the State of California as Hazardous Waste.

   7. Non-friable ACM may be disposed of as non-hazardous "Construction Debris" in California at a landfill willing to accept the waste. A non-frible manifest shall be

provided for each waste shipment.

B. Handling
   1. Materials are to be removed as intact sections or components whenever possible.

   2. All material shall be packed in sealed, impermeable containers.
      a. Double 6 mil. polyethylene or plastic bags may ordinarily be used.
      b. Large components removed intact may be wrapped in 2 layers of 6 mil. polyethylene sheeting secured with tape for transport to the landfill. All labeling requirements shall be met.
      c. Asbestos-containing waste with sharp-edged components (e.g., nails, screws, metal lath, tin sheeting) which may tear or puncture the polyethylene bags and sheeting shall be wrapped in additional layers of 6 ml. polyethylene and/or placed into fiberboard or steel drums for disposal.

   3. Contractor may bulk load asbestos-containing material into a 10 mil. polyethylene lined dumpster for transport if acceptable under local, state and federal regulations, and landfill accepting the waste.

   4. All containers shall be properly labeled in accordance with Title 8 CCR 1529.
      a. If containers are not pre-stenciled by manufacturer, adhesive labels including all required information are to be attached.
      b. Adhesive labels are to be securely attached and placed on the upper portion of the container.
      c. Each waste bag shall include generator information as required by federal and state regulations which shall be plainly visible.

C. Waste Pass-Out
   Remove all containerized waste from the work area through waste container pass-out airlock.
   1. Pre-clean all bags in the equipment area of the pass-out system.
   2. Clean exterior of bag.
   3. Pass through airlocks.
   4. Place in second bag on the clean side of the waste pass-out system.

D. Preparation for Transport
   1. Once drums, bags and/or wrapped components have been removed from the work area, they shall be loaded into an enclosed truck or roll-off dumpster for transportation to the landfill.

   2. Dumpsters or trucks shall have doors or tops that can be closed and locked to prevent vandalism or other disturbance of the bagged asbestos debris and wind dispersion of asbestos fibers. During periods in which dumpster doors remain open, Asbestos Abatement Contractor shall maintain one accredited employee at the dumpster continuously while doors are open to prevent unauthorized entry. There will be no exceptions.

   3. The enclosed cargo area of the container shall be free of debris and lined with 6 mil. polyethylene sheeting or spray-on poly material to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the sidewalls. Wall sheeting shall be overlapped and taped into place.

4. Unbagged material shall not be placed in these containers, nor shall they be used for non-asbestos waste. Bags shall be placed, not thrown, into these containers to avoid splitting.

5. Personnel loading asbestos containing waste shall be protected by disposable clothing including head, body and foot protection and at a minimum, half-face piece, air-purifying, dual cartridge/respirators equipped with high efficiency filters.

6. Drums shall be placed on level surfaces in the cargo area and packed tightly together to prevent shifting, tipping. Large structural components shall be secured to prevent shifting and bags placed on top. Do not throw containers into truck cargo area.

E. Transportation
1. Regulated ACBM's shall be taken off-site onto a public road only by a registered hazardous waste hauler in a registered hazardous-waste hauling vehicle.

2. County of Fresno's Designated Representative shall be notified at least 24 hours in advance of the time of any pick-up of asbestos waste.

3. Asbestos-waste in excess of 50 pounds taken onto a public road must be accompanied by a properly completed Hazardous Waste Manifest or Non-Hazardous Manifest.

4. Hazardous Waste Manifest must be signed by an individual designated by County of Fresno.

F. Documentation
1. On a weekly or per load basis, submit copies of all manifests and disposal site receipts and weigh tags to County of Fresno for Asbestos Related Work. Manifest number is to be recorded on weight tags. Each load requiring a manifest shall be weighed at the weigh station nearest the project.
   a. Receipts are to be returned to "The Generator" within 30 days.

3.9 INSPECTIONS AND TESTING - ASBESTOS ABATEMENT

A. General
1. County of Fresno reserves the right to perform visual inspections and to take bulk and air samples inside and outside the work area at any time during the project. Such activities shall be performed by County of Fresno's Representative. The Contractor has the right to observe and to review the results.

B. Documentation and Notices
1. County of Fresno reserves the right to document any positive or negative findings during visual inspections. Such findings shall be provided in writing if requested by the Asbestos Abatement Contractor.

2. Asbestos Abatement Contractor has the right to review such documentation and respond in writing to any point with which Asbestos Abatement Contractor disagrees. The decision of County of Fresno's Designated Representative concerning acceptable levels of cleanliness is final. The Asbestos Abatement Contractor shall abide by such decision and correct all deficient conditions to amend unsatisfactory findings to the acceptance of County of Fresno.

3. In case of a written notice of deficiency, Asbestos Abatement Contractor shall review and approve the notice. The signature shall represent only that Asbestos Abatement Contractor acknowledges receipt of the notice and shall not be construed as agreement with the findings.

C. Visual Inspections
   1. County of Fresno, or County of Fresno's Designated Representatives reserve the right to make visual inspections of the work area to evaluate progress, compliance with specifications and regulations, appropriate work procedures, and such other matters that may, if improper, create additional risk or liability for County of Fresno.

   2. Final Visual Inspection
      a. Asbestos Abatement Contractor shall have the responsibility to notify County of Fresno's Designated Representative 24 hours in advance of the readiness for final visual inspection at each containment location.
      b. County of Fresno's Designated Representative and Asbestos Abatement Contractor shall make a final visual inspection of each work area containement. Visual inspection shall be based on Scope of Work as reflected in project design documents, specifications requirements, and generally accepted industry standards for cleanliness.
      c. For removal, no residual material which can be removed by hand pressure or moderate abrading shall remain.

D. Air Monitoring - Asbestos Abatement Contractor
   1. Asbestos Abatement Contractor shall conduct daily air monitoring of its employees engaged in asbestos related work.

   2. Asbestos Abatement Contractor shall submit to results of air sample analysis to County of Fresno within forty-eight (48) hours of completion of shift during which samples were taken.

E. Air Monitoring - Representative
   1. County of Fresno's Representative may conduct air monitoring inside and outside the work area as deemed necessary to represent the interests of County of Fresno.

   2. Air sampling inside the work area which results in fiber counts greater than 0.1 f/cc (full-face, PAPR respirator in positive mode in use) or 1% of the rated protection limit of other respiratory protection in use at the time of sampling shall be deemed a necessary and sufficient reason to issue a STOP WORK order.

   3. Air sampling outside the work area which results in fiber counts higher than 0.01 f/cc, or baseline levels shall be deemed a necessary and sufficient reason to issue a STOP WORK order.

   4. Final clearance sampling shall be done for each containment area in which ACBM's are removed in compliance with current industry standards. Negative pressure ventilation units shall remain in operation during final air testing and shall remain in negative mode until Contractor receives notification from Owner's Representative that final air clearance for each containment area has meet specified clearance criteria.

   5. Analysis of Final Air Clearances shall be by TEM (AHERA) method.

- END OF SECTION 02 82 13

SECTION 02 82 14

ASBESTOS ABATEMENT FORMS

1.0 GENERAL

1.1 The following list of enclosed forms will be utilized in conjunction with the project.

FORM	DESCRIPTION	SUBMITTAL SCHEDULE
1.	Asbestos Contractor Information Detail **(Enclosed)**	With Material Submittals
2.	Emergency Information **(Contractor to Provide)**	Prior to Commencing Work
3.	Authorized Project Personnel **(Enclosed)**	Prior to Commencing Work
4.	Medical Testing Certification **(Enclosed)**	Prior to Commencing Work
5.	Respirator Fit Test Certification **(Contractor to Provide)**	Prior to Commencing Work
6.	Certificate of Worker's Acknowledgment **(Enclosed)**	Prior to Commencing Work
7.	Asbestos Waste Disposal Site **(Enclosed)**	Prior to Commencing Work
8.	Certificate of Visual Inspection **(Enclosed)**	Use for each visual clearance

All submittals shall be approved prior to commencing work, after award.

FORM 1
ASBESTOS CONTRACTOR INFORMATION DETAIL

Contracting
Firm:_____
Address:_____
Organizational Status: Corporation____ Partnership____ Individual____

Number of years firm in business:_____
Previous Company Names:_____
Dates:_____

Names and Positions of Firm Principals:
_____
_____

Name of Bonding Company:_____
Have you ever refused to sign a contract of your original bid_____
Have you ever defaulted on a contract_____
(If yes to either, attach statement with history of each event)

Bidder may be required to submit financial information at owners request.
List 5 projects of similar size and character which your company has completed with the last three years.

	Project Name, location	Owner (name, address, tel.)
1.		
2.		
3.		
4.		
5.		

	Contract Amount	Completion Date	Consultant/Architect
1.			
2.			
3.			
4.			
5.			

(Attach separate sheet with additional information as necessary)

Names of key personnel to participate in this project:
Project Manager:_____ No. yrs. experience_____
Superintendent:_____ No. yrs. experience_____
Foreman:_____ No. yrs. experience_____

_____
Authorized signature Title Date

FORM 2
AUTHORIZED PROJECT PERSONNEL

I certify that the following _____ (enter number) workers (whether employees or sub-contractors) used by _____ (company name) in the performance of any asbestos abatement activities for _____ (client name) on Project _____ have met all training, licensing and certification requirements of the Federal Government, and the State, County and City in which the work is taking place.

Attached are photocopies of all required training and licensing certificates for the workers listed.

Employee Name	**Social Security Number**
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____
_____	XXXX - XX - _____

_____ _____ _____
Date Authorized Signature Company Name

FORM 3
MEDICAL TESTING CERTIFICATION

I certify that the following _____ (enter number) personnel (whether employees, company officers of subcontractors) used by _____ (company name) in the performance of any asbestos abatement activities for _____ (client name) on Project _____ have received the necessary tests as specified in Federal Regulation 29 CFR Parts 1910.134, 1910.1001 and 1926.1101, and have had administered to them the Initial Medical Questionnaire included in Appendix D of CFR 1926.1101 and are qualified to wear respirators and to work on asbestos abatement projects.

Employee Name	**Social Security Number**	**Date of Last Exam**
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____
_____	XXXX- XX - _____	_____

_____ _____ _____
Date Physician's Signature License Number

(NOTE: Consultant reserves the right to accept photocopies of Contractor's own physician-signed forms in lieu of this certification if said forms provide the information required above.)

FORM 4
CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

Project Name _____ Date _____

Project Address _____

Contractor's Name _____

Working with asbestos can be dangerous. Inhaling asbestos fibers has been linked with various types of cancer. If you smoke and inhale asbestos fibers, then the chance that you will develop Lung Cancer is greater than that of the non-smoking public.

Your employer's contract with the Owner for the above project requires that:

1. You be supplied with the proper respirator and be trained in its use.
2. You be trained in safe work practices and in the use of the equipment found on the job.
3. You receive a complete medical examination in accordance with 29 CFR 1910.1001.

These things are to have been done at no cost to you.

Respiratory Protection: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be able to access a copy of the written respiratory protection manual maintained by your employer. You must be equipped at no cost with the respirator and miscellaneous cartridges, etc., to be used on the above project.

Training Course: You must have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. The topics covered in the course must have included the following:

1. Physical characteristics of asbestos
2. Health hazards associated with asbestos
3. Respiratory protection
4. Use of protective equipment
5. Pressure Differential Systems
6. Work practices including hands on or on-the-job training
7. Personal decontamination procedures
8. Air monitoring, personal and area

Medical Examination: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray.

By signing this document, you are acknowledging only that the Owner of the building you are about to work in has advised you of your rights to training and protection relative to your employer, the Contractor.

Signature _____ Soc. Sec. # XXX-XX-_____

Printed Name _____ Witness _____

FORM 5
ASBESTOS WASTE DISPOSAL SITE

Project #_____Title_____

Disposal Site Name _____

Site Identification Number _____

Site Supervisor Name

_____

Address _____

_____ Telephone (_____) _____ - _____

Owner/Operator Name

_____

Address _____

_____ Telephone (_____) _____ - _____

CONTRACTOR'S CERTIFICATION

The appropriate regulatory agency was queried, and the site named above was found to be authorized to accept asbestos waste.

Agency queried _____ Date _____

Agency Official Name _____

Telephone Number _____

Contractor's Signature _____

FORM 6
CERTIFICATE OF VISUAL INSPECTION

Date:_____, 202___ Project No. _____
Project:
Location:

CONTRACTOR ACKNOWLEDGMENT:

In accordance with the Project Specifications, the Contractor hereby certifies that he has visually inspected the Work Area (all roof surfaces) and has found no dust, debris or residue containing asbestos.

The Contractor certifies that he has completed all work at this location as required by project documents and in compliance with applicable law.

By: Signature:_____ Date_____, 202____
Print Name:_____, Project Supervisor
Contractor Firm Name:_____

PROJECT ADMINISTRATOR CERTIFICATE:

The Project Administrator hereby certifies that he has accompanied the Contractor on his visual inspection and verifies that this inspection has been thorough and to the best of his knowledge and belief, the Contractor's Certification above is a true and honest one.

By: Signature:_____ Date_____, 202____
Print Name:_____, Project Administrator
Firm Name:_____ Title_____

Comments:_____
_____
_____
_____

Final Air Clearance Performed: Yes__ No __ No. of Samples:___ Analysis: PCM___ TEM___

END OF SECTION 02 82 14

SECTION 02 82 15

RENOVATION OPERATIONS WITH LEAD-BASED & LEAD-CONTAINING PAINT

PART 1 - GENERAL

1.0 General

1.1 Scope of Work

1.1.1 The work under this section covers the disturbance of lead-based paint and lead-containing paint during planned renovation/demolition operations involving specified portions of the subject structures located at the specified site location. Lead-containing paint, glazing, and surface coatings are herein identified as those which contain any detectable amount of lead in accordance with 8 CCR 1532.1, and 29 CFR 1926.62. Lead-Based Paint (LBP) is herein identified as paint which contains in excess of 600 parts per million of lead (0.06% by weight) per 8 CCR 1532.1, and 1.0 mg/m^2 per Title 17, CCR Division 1, Chapter 8 and HUD Guidelines.

1.1.2 The Contractor shall provide all labor, materials, tools, equipment, supervision, and incidentals necessary to perform the work which includes disturbance of lead paint in accordance with this specification and applicable regulations. The Contractor shall thoroughly review this specification, and the previous Lead Inspection Report (**Attachment A**) to these specifications, to determine work which will impact lead-based paint and/or lead-containing painted finishes or surface coatings.

1.1.3 Unless indicated otherwise, the Contractor shall consider all painted surfaces and coatings which will be impacted by work associated with the project as lead-containing paint and shall conduct all work operations in accordance with these specifications, and all applicable local, state, and federal regulations for work involving disturbance of lead-containing materials.

1.1.4 The project includes renovation/demolition of interior areas of the subject commercial structures as described herein or in the project design documents. The Contractor shall conduct work operations based upon review of project design documents and a site visit to observe existing conditions which effect completion of the work.

1.1.5 All work involving disturbance of lead is to be conducted in accordance with all local, state, and federal regulations and statutes having jurisdiction over the work. Contractors shall thoroughly review design documents to determine scope of work.

1.1.6 The Contractor shall utilize means and methods as herein defined and per applicable regulations to complete the specified work. Painted elements which include lead-based paint in less than “intact” condition shall be removed, or the damaged paint scrapped and the surfaces sealed with primer in a manner which will not expose workers or others to levels of

airborne lead above Cal/OSHA prescribed levels. The Contractor shall conduct “trigger task” monitoring as prescribed by Cal/OSHA to demonstrate that proposed methods and procedures have not resulted in airborne levels above the OSHA “Action Level” and the “Permissible Exposure Limit”.

1.1.7 For the purposes of the project, “disturbance” shall consist of any work operation which penetrates, disturbs, or causes painted finishes to become detached or damaged. The Contractor will be responsible for all costs associated with stoppages, delays, and lead clearances required by their failure to accurately determine work which will involve disturbance of painted finishes determined or assumed to contain lead as defined herein.

1.1.8 Flaking, peeling, or damaged paint generated as a result of the work, or pre-existing damaged painted finishes to be impacted by the work are to be collected and segregated as a separate waste stream. All loose, peeling, or painted finishes determined to include lead-based paint which is peeling, chipping or flaking from the substrate shall be removed prior to commencing demolition operations which will disturb them. All building related debris generated by the work is to be disposed of as general construction debris in terms of lead content. The Contractor shall dispose of detached paint chips, lead-containing dust, HEPA vacuumed debris, and removed building elements with LBP, and related elements generated as a result of the work as RCRA lead waste. Detached paint chips and lead-containing dust shall be segregated from other waste streams and consolidated into properly lined and labeled drums and disposed in accordance with applicable local, state and federal regulations.

1.1.9 Contractor shall collect detached paint chips and related residue dislodged by the work from building components, or which existed on building finishes prior to start of work. The Contractor shall utilize high efficiency particulate air (HEPA) vacuums to clean up all visible paint chips and paint debris.

1.1.10 The Contractor shall conduct all operations, which include disturbance of lead-containing paint in accordance with applicable sections of the project design documents, and applicable local, state, and federal regulations.

1.1.11 The Contractor shall comply with all requirements of Title 8 CCR 1532.1, and Title 17, Division 1, Chapter 8 during all work involving lead disturbance. Air monitoring shall be conducted during all work operations involving disturbance of painted surfaces. Containment systems shall be constructed as required by applicable regulations to minimize spread of lead containing dust beyond the immediate work area.

1.1.12 Following specified demolition, Contractor shall remove all visible paint chips from bare soil and other horizontal surfaces surrounding the subject structure which were dislodged as a result of the work as directed by the County of Fresno or County of Fresno’s Representative.

1.1.13 This section shall constitute the definition of the lead related work as it relates to the referenced project.

1.2 Description of Work

1.2.1 The Contractor shall complete all work in accordance with project design documents in a manner which will maintain airborne lead levels below the OSHA “Action Level” and “Permissible Exposure Limit” during all work which includes disturbance of lead-containing, lead-based paint, and lead-containing surface coatings on building elements, equipment and fixtures on the subject property which are impacted during the course of the work. The Contractor shall conduct all work in specified areas where disturbance of lead-containing materials will occur. All lead-related work shall be completed in compliance with these specifications and applicable local, state and federal regulations.

1.2.2 Work involving disturbance of lead paint shall be performed in compliance with 8 CCR 1532.1, 17 CCR, Division 1, Chapter 8, HUD Guidelines, the State of California, Department of Public Health, Title 17, Division 1, Chapter 8, and all other local, state, and federal regulations relating to the disturbance of lead-based or lead-containing paint.

1.2.3 Contractor shall thoroughly review project specifications, drawings and addendums to accurately determine scope of work which may disturb lead-based or lead-containing paint and surface coatings. In addition, Contractor shall review the lead analysis of painted generated by the County of Fresnos’ Representative to determine locations of lead-based and lead-containing paint to be impacted by the proposed work operations. Unless indicated otherwise, the Contractor shall consider all surfaces with paint or surface coating and elements on building elements, equipment, and other elements to be impacted by the work within specified areas to include lead-based paint, or surface coatings. The Contractor shall not request additional compensation or additional work days based upon their failure to accurately determine the scope of work which involves the disturbance of lead-containing paint based upon comprehensive review of project specifications and drawings, and field verification of quantities, locations, and actual jobsite conditions affecting the scope of work.

1.2.4 Contractor shall be responsible for determining all conditions affecting proper execution of the work. Field verification shall be conducted where necessary to verify existing conditions prior to submission of bid on the work.

1.2.5 The Contractor shall properly dispose of all non-intact lead-based paint, (defined as paint not solidly adhered to a substrate), lead containing paint chips and dust, contaminated work articles and PPE, and all elements with intact lead-containing paint. Contractor shall properly dispose of wastewater generated during the work based on the results of a lead waste characterization conducted by the Contractor. Contractor shall include cost of waste characterizations in their bid for the work.

1.2.5.1 Contractor shall base bid on disposal of all loose or detached paint chips and dust generated during the work as RCRA waste in accordance with the Resource Conservation and Recovery Act (RCRA) of 1976. RCRA was amended in 1980 and most recently on November 8, 1984 by the

Hazardous and Solid Waste Amendment. Contaminated PPE and polyethylene film, vacuum debris and other articles and items contaminated with lead paint chips and/or lead dust shall also be disposed of as RCRA waste. Polyethylene film which is cleaned following use may be disposed of as general construction debris.

1.2.5.2 Contractor shall dispose of all building components, equipment, and other elements demolished as part of the work with intact painted finishes as non-hazardous general construction debris based on waste characterization conducted by the Contractor. The Contractor shall include the cost of the waste characterization(s) in its bid for the work. A separate waste characterization shall be provided for each waste stream.

1.2.5.3 Should Contractor discover suspect asbestos-containing materials to be impacted as part of the work which have not been identified in the previous survey report, Contractor shall stop work and request clarification from County of Fresno before proceeding with work under the Contract.

1.3 Experience and Workmanship

1.3.1 The Contractor performing the work shall be properly licensed in the State of California to conduct the proposed work operations. The Contractor shall be required to provide proof of lead-related training appropriate for demolition operations with intact lead paint.

1.3.2 The Contractor performing this work MUST be familiar with all applicable regulations covering disturbance of lead paint. This includes all permits, licenses, and certificates required to perform this type of hazardous work and related disposal requirements.

1.3.3 A “Lead Compliance Plan” per 8 CCR 1532.1, outlining the methods and controls to be used during the performance of this work will be submitted to the County of Fresno as part of the submittal package and approved prior to the start of any work involving disturbance of painted finishes. A separate “Compliance Plan” shall be prepared by each contractor engaged in work on the project which includes disturbance of lead-containing paint.

1.3.4 It is the Contractor’s responsibility to maintain adequate controls and perform personal air monitoring to ensure worker safety for lead related work for the duration of the project. Lead Abatement Contractor shall provide personal air monitoring results to County of Fresno’s Representative within 48 hours of the shift during which they were collected.

1.4 Personal Training and Protection

1.4.1 Personnel Training

1.4.1.1 Any worker involved in lead related work as defined in this Specification must have successfully completed a lead training course as required by 8 CCR, 1532.1 and 17 CCR, Division 1, Chapter 8. The specified training shall meet regulatory

requirements based on anticipated exposure levels as described in 8 CCR 1532.1. The Contractor shall provide documentation of current training. Workers engaged in work defined as lead "Abatement" under 17 CCR, Div. 1, Chapter 8, or if any personal air sampling sample exceeds the Permissible Exposure Limit of 50 ug of lead shall have as a minimum CDPH level training and be certified by the State of California, Department of Public Health.

1.4.1.2 Lead Supervisor shall have lead-specific training from a qualified training provider. Where required, trainer shall be certified by the State of California, CDPH.

1.4.1.3 The lead training shall be presented by a qualified training provider. Where required, training shall be by a California Department of Public Health (CDPH), Childhood Lead Poisoning Prevention Program, Accredited Lead Training Provider. Lead training, where appropriate, may be provided by a lead "competent person" as defined by Cal/OSHA.

1.4.1.4 Workers and Supervisors shall have lead training as required by CCR 1532.1 and Title 17 CCR Div. 1, Chapter 8 commensurate with the anticipated exposure level. Should initial exposure monitoring exceed the anticipated level, workers and supervisors engaged in lead related work represented by the monitoring shall receive additional training as required to proceed with the work, or properly trained and certified individuals shall replace improperly trained personnel. Work shall cease until such time as training and other requirements are met.

1.4.2 Biological Monitoring (Lead Workers, Supervisors and Demolition Personnel)

1.4.2.1 The Contractor shall conduct biological (blood testing) on it's employees engaged in work involving disturbance of lead in accordance with Cal/OSHA requirements (8 CCR 1532.1) and shall submit evidence that monitoring is current for all employees that will enter any regulated lead work area.

1.4.2.2 A worker will be removed from the job if their blood lead level is 50 ug/dl or greater [29 CFR 1926.62 (k)]. The Contractor shall be responsible for medical surveillance and record keeping in accordance with 8 CCR 1532.1.

1.4.3 Initial Determination

1.4.3.1 The Contractor shall conduct an initial determination of the worker lead exposures for each specific task required by Cal/OSHA Construction Lead Standard (Title 8 CCR 1532.1). Exposures shall be conducted for each specific task and shall be during periods and activities likely to generate the highest

possible exposure level.

1.4.3.2 All Contractor employee categories shall be included in the exposure monitoring.

1.4.3.3 The duration of air monitoring shall be sufficient to provide a statistical confidence (95% upper confidence limit) that no employees are exposed above the lead “AL” or the “PEL”.

1.4.3.4 Until initial determination is completed, Contractor shall conduct work utilizing the highest degree of engineering (barriers, two-stage, or three-stage contamination) administration and respiratory protection controls required by applicable regulations governing lead work.

1.4.3.5 A copy of the Contractor’s initial determination shall be provided to the County of Fresno’s Representative.

1.4.4 Respiratory Protection

1.4.4.1 The Contractor shall provide all workers, foremen, and superintendents with properly fitted respirators approved by NIOSH and OSHA, and as determined by the results of the initial determination. Respirators are required at all times when engaged in work on this project which involves the disturbance of lead-containing painted, coated, or glazed surfaces, or other lead-containing materials.

1.4.4.2 Authorized visitors (i.e., federal, state, and local inspectors) must provide a current health and medical report certifying them as approved to wear half-face respirators prior to entering any containment area.

1.4.4.3 When respirators and disposable filters are employed, sufficient replacement filters will be provided by the Contractor for the workers and any visitors. Respirators shall be type P100 and be NIOSH approved.

1.4.4.4 The minimum respiratory protection required for this project shall be based upon initial air monitoring results specific from this project and completion of “trigger tasks” required by 8 CCR 1532.1.

- Negative pressure, half-mask, air purifying respirators, equipped with HEPA filters for airborne lead dust levels not in excess of 0.5 mg/m^3 (10 x PEL). Base bid on use of this type of respirator.

- Full face piece air purifying respirator, with HEPA filters for airborne dust levels not in excess of 2.5 mg/m^3 (50 x PEL).

- Pressure demand, full face piece, supplied air respirators for

airborne lead dust concentrations are expected to meet or exceed 50 mg/m^3 (1000 x PEL).

1.4.4.5 All workers inside the LEAD work area shall wear the proper respirator for the lead dust level generated.

1.4.4.6 Workers must be properly trained in the care, use, and maintenance of respirators.

1.4.4.7 The Contractor shall ensure that a respiratory fit-test was performed and passed by each lead worker within the last eleven (11) months. Evidence of current fit tests specific to each respirator brand, type, model and size shall be submitted. Includes fit-testing of each proposed respirator type for each employee.

1.4.4.8 A formal respiratory protection program must be implemented in accordance with 29 CFR 1910.134.

1.4.4.9 Respirators will not be removed until the worker enters the shower area of the decontamination chamber.\

1.4.5 Personal Protection Equipment

1.4.5.1 Workers will wear full body disposal suits with hoods and booties. A *TYVEK* or similar type of suit will be worn. Suits will be worn inside the work area after the area passes pre-lead inspection and shall remain in use until the area passes final clearance inspection. Light-weight nylon clothes may be worn under the suit, but these clothes must be changed before leaving the work area and should be laundered separately.

1.4.5.2 Goggles with side shields will be worn when working with a material that may splash or fragment, or if protective eye wear is specified on the MSDS for that product.

1.4.5.3 Additional respiratory protection by supplemental filters, such as organic vapor cartridges, may be needed when handling some coating products. Consult the MSDS for each product use during performance of the work and obtain the proper filters as appropriate based upon the potential routes of exposure.

1.4.6 Personal Hygiene Practices

1.4.6.1 The Contractor shall enforce and follow good personal hygiene practices during lead abatement. These practices will include, but not be limited to, the following:

1.4.6.1.1 No eating, drinking, smoking, chewing gum or tobacco, or applying of cosmetics in work area. The Contractor will provide a clean space, separated from the work area, for these activities.

1.4.6.1.2 All workers must wash upon leaving the work area. Wash facilities will be provided by the Contractor consisting of, at least, running water, towels, and a HEPA vacuum. Upon leaving the work area, each worker will remove and dispose of work suit, wash and dry face and hands, and vacuum clothes. An appropriate emergency eyewash station shall be available for use.

1.4.6.1.3 Disposable clothing such as *TYVEK* suits and other personal protective equipment (PPE) must be donned prior to entering any lead work area. A clean room will be provided for workers to put on suits and other personal protective equipment and to store their street clothes. Disposable suits shall be used once and then properly discarded.

1.4.6.1.4 A hand-washing facility must be provided and located in close proximity of eating and drinking area. The washing station will be maintained in clean condition and drained daily, or whenever required to maintain in clean condition.

1.4.6.2 If air monitoring data gathered by the Contractor shows that employee exposure to airborne lead exceeds 50ug/m^3, the following conditions apply:

- Street clothes cannot be worn into containment. Workers must wear nylon shorts, TYVEK shorts, or nothing under a disposable suit.

- Showers must be provided. Shower water must pass through at least a 5.0 micron filter before returning to the public waste system. Disposal of waste water shall meet the requirements of the local regional water quality district.

1.5 Definitions and Abbreviations

The following definitions apply to the work of this specification:

1.5.1 **AA** - Atomic absorption.

1.5.2 **AC** - Alternating current.

1.5.3 **ACCREDITED LABORATORY** - A laboratory which is accredited by the American Industrial Hygiene Association, participates in the Proficiency Analytical Program (PAT), and is accredited by the State of California's Environmental Laboratory Accreditation program.

1.5.4 **ACCURACY** - The degree to which a measurement determines a known amount of lead or other component in a particular reference material.

1.5.5 **ACTION LEVEL (AL)** - The point at which something is required due to the presence of lead. For example, the OSHA action level for airborne lead is 30 ug/m^3.

1.5.6 **AIR MONITORING (air sampling)** - The process of measuring the lead content of a specific volume of air using the National Institute for Occupational Safety and Health (NIOSH) method or other method approved by the County of Fresno. Flow rate and sampling volume shall be in accordance with the method chosen. Also see Area Monitoring and Exposure Monitoring.

1.5.7 **AIRLOCK** - A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least 6 feet apart.

1.5.8 **AMENDED WATER** - A water to which a surfactant, such as trisodium phosphate, has been added.

1.5.9 **ANSI** - American National Standards Institute.

1.5.10 **AREA MONITORING** - Air monitoring of lead concentrations within the lead abatement area and outside the lead area, which is a representative of the ambient airborne concentration of lead. Also see Exposure Monitoring.

1.5.11 **ASHREA** - American Society of Heating, Refrigerating and Air-Conditioning Engineers.

1.5.12 **ASME** - American Society of Mechanical Engineers

1.5.13 **ASSOCIATED SURFACE** - Interior/exterior walls, hangers, duct work, duct work insulation, conduit, electrical cables, light fixtures, junction boxes, panel boxes, building insulation materials and other items joined with or adjacent to structural members.

1.5.14 **ASTM** - American Society of Testing and Materials.

1.5.15 **AUTHORIZED VISITOR** - Any visitor to the site whose visit has been authorized by the County of Fresno.

1.5.16 **BARRIER** - A physical structure such as a wooden or tape (yellow ribbon with lead hazard warning signs) barricade, which defines the limits of the containment area wherein LBP abatement is occurring. This is the basic, first level, Engineering control; the second level control is a two-stage containment (dirty room and clean/change room) with negative air; the third level control is a three-stage containment (dirty room, shower and clean/change room) with negative air. The level of engineering control is predicated on the type of LBP abatement methods employed and/or the results of initial and ongoing lead air monitoring results.

1.5.17 **BIENNIAL REPORT** - A report (EPA Form 8700-13A) submitted to generators of hazardous waste to the Regional Administrator due March 1

of each even-numbered year. The report includes information on the generator=s activities during the previous calendar year. The County of Fresno or operator of a treatment, storage and disposal facility must also prepare and submit a biennial report using EPA Form 8700-1313.

1.5.18 **BIOLOGICAL MONITORING** - The analysis of a person=s blood and/or urine to determine the level of lead contamination in the body. The OSHA Lead standard requires biological monitoring as part of the medical surveillance requirements.

1.5.19 **BLANK** - A non-exposed sample of the medium used for testing, such as a wipe or filter, which is analyzed like other samples to determine whether samples are contaminated with lead before samples are collected (e.g., at the factory or at the testing site), or whether the samples are contaminated after sample collection (e.g., during transportation to the laboratory or in the laboratory).

1.5.20 **COUNTY OF FRESNO'S REPRESENTATIVE** - The individual or firm retained by the County of Fresno to oversee lead-related work and to provide testing services on its behalf.

1.5.21 **CFR** - The Code of Federal Regulations is the basic component of the Federal Register publication system. The CFR is a codification of the requirements of the various federal agencies.

1.5.22 **CHARACTERISTICS** - EPA has identified four characteristics of hazardous waste: ignitability; corrosivity; reactivity; and toxic characteristic leaching procedure (TCLP) toxicity (formerly extraction procedure (EP) toxicity). Any solid waste that exhibits one or more of these characteristics is classified as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). See EP Toxicity and TCLP.

1.5.23 **CLEAN ROOM** - An uncontaminated area or room which is part of the workers decontamination facility, with provisions for storage of workers= street clothes and clean or unused protective equipment.

1.5.24 **CONTAINER** - Any portable device in which material is stored, transported, treated, disposed of, or otherwise handled.

1.5.25 **CONTAINMENT** - An isolation method for protecting both workers and the environment by controlling exposures to lead dust and debris created during lead control. Two levels of containment are identified beyond the barrier stage: a TWO-STAGE containment (dirty room and clean/change room) with negative air and a THREE-STAGE containment (dirty room, shower and clean/change room) with negative air.

1.5.26 **CONTAINMENT AREA** - A work area or zone for lead abatement work that is defined by tape, signage and/or physical barriers.

1.5.27 **CONTRACTOR** - Any business entity, public unit, or person performing the role of LBP abatement contractor for the project.

1.5.28 **DF** - Decontamination Facility.

1.5.29 **DI** - Draft included.

1.5.30 **DISPOSAL** - The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that any constituent therefore may enter the environment or be emitted into the air or discharged in any waters, including ground waters.

1.5.31 **DISPOSAL FACILITY** - A facility or part of a facility at which hazardous waste is intentionally placed into or on any land or water, and at which waste will remain after closure.

1.5.32 **DOT** - Department of Transportation.

1.5.33 **ENCAPSULANT** (sealant) - A liquid material which can be applied to lead containing areas and which controls the possible release of lead from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).

1.5.34 **ENCAPSULATION** - Involves resurfacing or covering a surface, and sealing or caulking with durable materials, so as to prevent or control chalking and flaking or lead-containing substances.

1.5.35 **ENCLOSURE** - See Containment Area and Barrier.

1.5.36 **ENGINEERING CONTROLS** - Measures implemented at the work site to physically/mechanically contain, control, and/or otherwise reduce exposure to lead dust and debris. Does not included administrative and/or respiratory protection controls.

1.5.37 **EP** - Extraction procedure.

1.5.38 **EPA** - Environmental Protection Agency.

1.5.39 **EPA IDENTIFICATION** - The unique number assigned by EPA to each generator or transporter or hazardous waste, and each treatment, storage, or disposal facility.

1.5.40 **EP TOXICITY** - A test, called the extraction procedure, that is designed to identify wastes likely to leach hazardous concentrations of particular toxic constituents into the ground water as a result of improper management. EP toxicity is a characteristic of hazardous waste. It has been replaced by TCLP as the acceptable method. See TCLP and Characteristics.

1.5.41 **EQUIPMENT ROOM** - A contaminated area or room that is part of the workers= decontamination facility, with provisions for storage of contaminated clothing and
equipment.

1.5.42 **EU** - Exhaust Unit

1.5.43 **EXPOSURE MONITORING** - Worker air monitoring to establish initial or to document ongoing lead exposure levels. Must be done to enable each employee=s exposure level to be reasonably represented by at least on full-shift (at least 7 hours) air sample.

1.5.44 **FACILITY** - All continuous land, structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units, e.g., one or more landfills, surface impoundments, or combination of them.

1.5.45 **FEDERAL REGISTER** - A document published daily by the federal government that contains either proposed or final regulations.

1.5.46 **FINAL INSPECTION** - Inspection by a certified inspector/assessor industrial hygienist, or local public health official to determine whether lead abatement work and clean up are complete.

1.5.47 **ft²** - Square feet

1.5.48 **CF** - Cubic feet

1.5.49 **CFM** - Cubic feet per minute

1.5.50 **GENERATOR** - Any person who first creates a hazardous waste or any person who first makes the waste subject to the Subtitle C regulation (i.e., imports a hazardous waste; initiates a shipment of a hazardous waste from a hazardous waste treatment, storage or disposal facility (TSD); or mixes hazardous wastes of different Department of Transportation (DOT) shipping descriptions by placing them into a single container.)

1.5.51 **GFCI** - Ground fault circuit interrupter

1.5.52 **GROUND WATER** - Water below the land surface in a zone of saturation.

1.5.53 **H20** - Water

1.5.54 **HAZARDOUS WASTE** - As defined in RCRA, a solid waste or combination of solid wastes which, because of its quantity, concentration or physical, chemical or infectious characteristics, may:

1.5.54.1 Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible, illness, or

1.5.54.2 Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed. As defined in the regulations, solid waste is hazardous if it meets one of four conditions:

1.5.54.2.1 Exhibits a characteristic of a hazardous waste (40 CFR Section 261.20 through 262.24).

1.5.54.2.2 Has been listed as hazardous (40 CFR Section 261.31 through 261.33).

1.5.54.2.3 Is a mixture containing a listed hazardous waste and a non hazardous solid waste (unless the mixture is specifically excluded or no longer exhibits any of the characteristics of hazardous waste).

1.5.54.2.4 Is not excluded from regulation as a hazardous waste.

1.5.55 **HEPA** - High efficiency particulate air.

1.5.56 **HEPA VACUUM** - A specially-designed vacuum cleaner fitter with a HEPA filter.

1.5.57 **HIGH EFFICIENCY AIR (HEPA) FILTER** - A filter capable of filtering out particles of 0.3 microns or greater from a body of air at 99.97% efficient against mono-dispersed particles that are 0.3 microns in diameter or larger.

1.5.58 **HIGH PHOSPHATE DETERGENT** - Detergent which contains at least 5% trisodium phosphate (TSP) or other approved additive.

1.5.59 **HUD** - United States Department of Housing and Urban Development.

1.5.60 **HUD LBP Guidelines** - Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, June 1995, pursuant to Title X of the Housing and Community Development Act of 1992, Department of Housing and Urban Development.

1.5.61 **ICP, AES** - Inductively coupled plasma, atomic emission spectroscopy.

1.5.62 **INDUSTRIAL HYGIENIST** - A person certified by the American Board of Hygiene or an industrial hygienist in training, or an individual with equivalent education or experience.

1.5.63 **INITIAL DETERMINATION** - Includes instrument monitoring of the air for the presence of lead and covers the exposure of a representative number of employees who are reasonably believed to have the greatest exposure. Provides the basis for the determination of the level of engineering controls, degree of respiratory protection and other required actions.

1.5.64 **KG** - Kilogram(s)

1.5.65 **LANDFILL** - A disposal facility where hazardous waste is placed in or on land and which is not a land treatment facility, a surface impoundment, or an injection well.

1.5.66 **LEAD ABATEMENT** - A comprehensive (removal, encapsulation, enclosure, etc.) of eliminating exposure or potential exposure to lead dust which must include monitoring, measures for worker protection,

containment of dust and debris, cleanup and disposal of waste and clearance testing.

1.5.67 **LEAD PERMISSIBLE EXPOSURE LIMIT (PEL)** - The limit is 50 micrograms per cubic meter of air as an 8-hour, time weighted average.

1.5.68 **LOCAL EXHAUST SYSTEM** - A system in which static pressure in an enclosed abatement area is lower than that of the environment outside the abatement area,
as specified herein.

1.5.69 **MANIFEST** - The shipping document, EPA form 8700-22, used for identifying the quantity, composition, origin, routing and destination of hazardous waste during its transportation from the point of generation to the point of treatment, storage or disposal.

1.5.70 **MEAN** - The arithmetic average of data values. The algebraic sum of the data values divided by the number of data values. When using an XRF instrument, the mean is the average of a series of numerical readings reported by the instrument.

1.5.71 **MEDICAL REMOVAL** - The temporary removal of workers due to elevated blood lead levels as defined by the OSHA Lead standard.

1.5.72 **mg/cm²** - Milligrams per square centimeter

1.5.73 **MICROGRAMS** - The prefix “micro” means “1/1,000,000 of (one millionth of). A microgram is 1/1,000,000 of a gram and 1/1000 of a milligram. A microgram is equal to about 35/1,000,000,000 (thirty-five billionths) of an ounce. 28,400,000 ug are equal to 1 ounce.

1.5.74 **MIL** - Millimeter

1.5.75 **MSDS** - Material Safety Data Sheet - OSHA Form 20 or equivalent forms containing health hazard information about chemical products.

1.5.76 **NAM** - Negative air machine

1.5.77 **NEGATIVE AIR MACHINE (NAM, AHOG@)** - A self-contained local exhaust machine utilized in a negative air pressure system.

1.5.78 **NEGATIVE AIR PRESSURE SYSTEM** - A local exhaust system capable of maintaining a minimum pressure differential of minimum 0.02 inch of water gauge in a work area relative to adjacent areas.

1.5.79 **NEMA** - National Electrical Manufacturers Association.

1.5.80 **NIOSH** - National Institute of Occupational Safety and Health.

1.5.81 **OSHA** - Occupational Safety and Health Administration

1.5.82 **COUNTY OF FRESNO –** As used in this Specification, the County of

Fresno is the County of Fresno, Fresno, California.

1.5.83 **PAPR** - Powered air purifying respirator

1.5.84 **PEL** - Permissible exposure limit

1.5.85 **PERMIT** - An authorization license or equivalent control document issued by EPA or an authorized State to implement the regulatory requirements of Subtitle C Parts 264 and 265 for TSDs.

1.5.86 **PRECISION** - The degree of repeatability of a series of successive measurements.

1.5.87 **PSI** - Pounds per square inch

1.5.88 **RCRA** - Resource Conservation and Recovery Act of 1976. An amendment to the Solid Waste Disposal Act of 1965. RCRA was amended in 1980 and most recently on November 8, 1984 by the Hazardous and Solid Waste Amendment.

1.5.89 **REGULATION or RULE** - All or part of any Federal statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy; or describe the Federal Department=s organization or its procedure or practice requirements.

1.5.90 **REMOVAL** - All herein-specified procedures necessary to mechanically or chemically strip all LBP from the designated areas and to dispose of these materials at an acceptable site.

1.5.91 **REPLACEMENT** - A strategy of lead abatement which entails the removal of components such as windows, doors, and trim that have lead-painted surfaces and installing new components free of lead paint.

1.5.92 **SCRAPING** - Removing loose, peeling or chipped LBP from the substrate; collection of debris and disposal as a hazardous waste. Usually performed with hand tools such as a broad blade putty knife; does not include sanding (manual or powered).

1.5.93 **SHOWER ROOM** - A room between the clean room and the equipment or dirty room in the worker decontamination facility, with not and cold running water, soap, shampoo, suitably arranged for complete showering during decontamination.

1.5.94 **SITE** - The land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

1.5.95 **SOLID WASTE** - As defined in RCRA, any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including solid, liquid, semisolid or contained gaseous
material resulting from industrial, commercial, mining and agricultural

operations and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under the Clean Water Act, or special nuclear or byproduct material as defined by the Atomic Energy Act of 1954.

1.5.96 **SPECTRUM ANALYZER (XRF)** - A type of XRF analyzer which provides the operator with a plot of the energy and intensity of both AK@ and AL@ shells, as well as a calculated lead concentration, expressed in mg/cm5.

1.5.97 **STANDARD** - Used in two ways:

1. levels established by law or regulation, such as the Cal/OSHA "PEL" of 50 µg/m;

2. materials to which known quantities of lead have been applied.

Used to evaluate the accuracy and performance of the XRF analyzer, usually called Standard Reference Materials.

1.5.98 **STEL** - Short term exposure limit

1.5.99 **STORAGE** - The holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of or stored elsewhere.

1.5.100 **STRUCTURAL MEMBERS** - Beams, cross bracing, main frame members, floor/roof slab with steel frame and joist, steel roof decking, steel hangers, steel tubes, welded steel boxes and other steel shapes.

1.5.101 **SUBSTRATE** - A surface upon which paint or varnish has been or may be applied. Examples of substrates include wood, plaster, metal and drywall.

1.5.102 **SURFACTANT (Wetting Agent)** - A chemical wetting agent added to water to improve penetration.

1.5.103 **TCLP** - Toxic Characteristic Leaching Procedure (see EP Toxicity Test and Characteristics).

1.5.104 **TIME-WEIGHTED AVERAGE (TWA)** - The TWA is an 8-hour, time-weighted average of airborne concentration for lead per cubic meter of air which represents the employees 8-hour workday.

1.5.105 **TLV-STEL** - Threshold limit value - short term exposure limit

1.5.106 **TLV-TWA** - Threshold limit value - time weighted average

1.5.107 **TRANSPORTER** - Any person engaged in the off-site transportation of hazardous waste within the United States, by air, rail, highway or water, if such transportation requires a manifest under 40 CFR Part 262

1.5.108 **TREATMENT** - Any method, technique or method, including neutralization,

designed to change the physical, chemical or biological character or composition of any hazardous waste so as to neutralize it or render it non-hazardous or less hazardous, or to recover it, make it safer to transport, store or dispose of, or amenable for recovery, storage or volume reduction

1.5.109 **TSD** - Hazardous waste treatment, storage or disposal facility.

1.5.110 **TSP** - Trisodium phosphate

1.5.111 **TWA** - Time weighted average

1.5.112 **µg**: **Micrograms** - The prefix "micro" means "1/1,000,000 of (one millionth of). A microgram is 1/1,000,000 of a gram and 1/1000 of a milligram. A microgram is equal to about 35/1,000,000,000 (thirty-five billionths) of an ounce. 28,400,000 ug are equal to 1 ounce.

1.5.113 **µg/m;** - Micrograms per cubic meter

1.5.114 **µg/ft5** - Micrograms per square foot

1.5.115 **µg/g** - Microgram/gram

1.5.116 **UL** - Underwriters Laboratories

1.5.117 **µm** - Micrometer

1.5.118 **U.S**. - United States

1.5.119 **WET CLEANING** - Eliminating lead contamination from building surfaces and objects by using cloths, mops or other cleaning tools which have been dampened by water amended with TSP, and afterwards disposing of these cleaning tools as lead-contaminated waste.

1.5.120 **WORK AREA** - A room or location in which lead is indicated to be removed under the contract.

1.5.121 **WORK PRACTICE CONTROL** - See Engineering Controls

1.6 Standards and Guidelines

1.6.1 The current issue of each document shall govern. Where conflict among requirements or within these specifications exist, the more stringent requirements shall apply.

1.6.2 General Applicability of Codes, Regulations and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the specification, all applicable codes, regulations, and standards have the same force and effect (and are made part of the specification by reference) as if copied directly into the specification, or as if published copies are bound herewith.

1.6.3 **Contractor Responsibility:** The Contractor shall assume full

responsibility and liability for compliance with all applicable federal, state and local regulations pertaining to work practices, hauling, disposal and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of all personnel as required by the applicable federal, state and local requirements.

In addition, the Contractor will be responsible for obtaining all local permits and paying all fees prior to beginning work. Copies of permits must be submitted to County of Fresno's Representative prior to the start of work and must be posted at the project.

1.6.4 **HUD LBP Guidelines:** The Contractor shall comply with all provisions and/or responsibilities, as applicable, contained in the Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, pursuant to Title X of the Housing and Community Development Act of 1992, Department of Housing and Urban Development.

1.6.5 Occupational Safety and Health Act

1.6.5.1 The Contractor shall comply with the requirements of the General Industry Safety and Health Standards, 29 CFR Part 1910, the Safety and Health Regulations for Construction, 29 CFR Part 1926, the California Lead in Construction Standard - Title 8 CCR 1532, including all other standards and regulations which administer such Acts, and said requirements, standards and regulations as incorporated herein by reference.

1.6.5.2 The Contractor shall strictly adhere to the provisions of the following 29 CFR Sections:

1910.1025: Lead Standard
1910.134: Respiratory Protection
1910.302-307, 1926.400: Electrical
1910.28, .29, .67, .22, .23, .66, 1926.451: Scaffolding
1910.22, .100h, 1926.25: Housekeeping
1910.1200: Hazard Communication (Employee Right-to-Know)
1910.25, .26, 1926.450: Ladders
1910.37, .38: Egress and Emergency Plans
1919.95, .132-.137, .1001, 1926.28, .100-.014: Personal Protective Equipment
1910.141, 1926.27, .51, .950h: Sanitation
1910.242-.244, 1926.302: Powered Hand Tools
1926.16: Contractors Responsibilities
1926.20: General Safety and Health Provisions
1926.21: Safety Training and Education
1925.25: Housekeeping
1926.28: Personal Protective Equipment
1926.51(f): Washing Facilities
1926.55: Gases, Vapors, Fumes, Dusts and Mists
1926.57: Ventilation
1926.59: Hazardous Communication Standard

1926.62: Lead
1926.103: Respiratory Protection
1926.353(c): Ventilation: Welding, Cutting or Heating of Metals of Toxic Significance

Copies of these standards are available from OSHA.

1.6.5.3 Compliance with the requirements of referenced state and federal standards will be strictly enforced by County of Fresno's Representative.

1.6.6 State and Local Requirements

1.6.6.1 The Contractor shall comply with the following State of California Department of Occupational Safety and Health Regulations: Title 8 California Code of Regulations: Construction Industry Safety Orders, Lead Regulations.

1.6.6.2 The Contractor shall comply with the following State of California, Department of Public Health Regulations: Title 17 California Code of Regulations, Division 1, Chapter 8: Accreditation of Training Providers and Interim Certification of Individuals Engaged in Lead-Related Construction Work.

1.6.6.3 The Contractor shall comply with the Notification requirements of the State of California, Department of Public Health and shall file a completed notification a minimum o f five (5) days prior to commencing lead related activities classified as "abatement" as defined under Title 17, Division 1, Chapter 8.

1.6.6.4 The Contractor shall comply with the Notification requirements of Cal/OSHA under 8 CCR 1532.1.

1.6.6.5 The Contractor shall comply with the Federal Environmental Protection Regulations pertaining to handling and disposal of lead-containing materials as well as the State of California and any local governmental agencies which have delegated responsibility for the administration and enforcement of federal regulations.

1.6.6.6 The Contractor shall comply with the California Air Resources Board, Executive Order G-565 and associated Advisory Abrasive Certification List.

1.6.6.7 The Contractor shall comply with all requirements of the EPA-approved landfill which is selected as the disposal site.

1.6.6.8 Contractor shall comply with all requirements of the Regional Water Quality Board for disposal of waste water which contains lead, in addition to all local, state, and federal water quality standards.

1.6.7 Other Requirements

1.6.7.1 American National Standards Institute (ANSI) - ANSI Z9.2. Fundamentals Governing the Design and Operation of Local Exhaust Systems.

1.6.7.2 The Contractor shall comply with said regulations, requirements, and standards (noted above) and require and be directly responsible for compliance therewith on the part of his agents, employees, suppliers and Subcontractors; and shall directly receive and be responsible for all citations, assessments, fines or penalties which may be insured by reason of his agents, employees, suppliers or Subcontractors failing to so comply.

1.6.7.3 The Contractor shall indemnify the County of Fresno and T. Brooks & Associates, a Division of Provost and Pritchard from any and all losses, costs and expenses, including fines, judgments, and reasonable attorney's fees incurred either indemnified party by reason of negligence on the part of the Contractor in exposing his employees, County of Fresno personnel, visitors, and/or in the proper or accepted procedures dealing with lead abatement and/or the real or alleged violation of such laws, ordinances, regulations, and directives (federal, state and local) which are currently in effect or which become effective in the future, by the Contractor, his Subcontractors, or suppliers.

1.7 Submittals and Notices

WITHIN TEN (10) CALENDAR DAYS AFTER THE NOTICE OF INTENT TO AWARD, PROVIDE THE FOLLOWING SUBMITTALS TO THE COUNTY OF FRESNO;

1.7.1 Submit proof satisfactory that all required permits, site locations and arrangements for transport and disposal of lead-based materials wastes and the like have been obtained including, but not limited to, the following:

1.7.1.1 The EPA hazardous waste generator identification number (GIN)

1.7.1.2 The name and appropriate certification/licenses of the hazardous materials transport firm(s).

1.7.1.3 The name and appropriate certification/licenses of the landfill and/or incinerator facility.

1.7.2 Submit to County of Fresno for information and approval, a description of the plans for phasing and construction of the decontamination system(s), waste load-out area(s), and containment area(s) used to isolate the functional space(s) in compliance with this specification and applicable regulations. These requirements shall be met by submission of shop drawings on which each of these areas are clearly identified. The "submittal" shall include the name and credentials of the laboratory that the Contractor proposes to use for testing.

1.7.3 Submit to County of Fresno for approval, a "Lead Compliance Plan" for the project in accordance with 8 CCR 1532.1. The plan shall clearly identify

the work method(s), containment plan(s) by floor or section, timelines and responsible parties.

1.7.4 Submit a written respiratory protection plan as required in 29 CFR 1910.1025(e)(3).

1.7.5 Submit a written medical examination and consultation plan that includes the items required by 29 CFR 1920.1025(j)(3).

1.7.6 Submit certifications documenting that employee information and training for lead exposure has been completed for Contractor and other affected subcontractors.

1.7.7 The Contractor shall also submit the following:

1.7.7.1 Weekly work schedule.

1.7.7.2 Method of application and materials to be used.

1.7.7.3 Test for personal air monitoring and, as appropriate (two and three-stage containments), air pressure differential between work areas and external air.

1.7.7.4 Submit various manufacturers information (including MSDS) and type and brands of materials for workers protection

1.7.7.5 Drawings showing the location, phasing and construction of the decontamination system(s), waste load-out area(s), and containment area(s) used to isolate the functional space(s) in compliance with this specification and applicable regulations.

1.7.7.6 Schedule for changing filters in negative air pressure system (only required if area and exposure monitoring indicated the need for two or three-stage containment system) and water filtration system.

1.7.7.7 Copies of all daily manpower and work logs indicating area(s) and type of work performed.

1.7.7.8 Copies of all certifications of disposal.

1.7.7.9 Copies of permits.

1.7.7.10 Copies of all OSHA Form 101 or equivalent CAL/OSHA accident/injury/incident reports.

1.7.7.11 All “submittals” and notices required by this section shall be provided to County of Fresno’s Representative for review and approval prior to commencing work operations.

1.7.7.12 Contractor shall provide project “submittal” in electronic format with a Table of Contents.

1.8 Air Monitoring Requirements

1.8.1 Initial Determination

1.8.1.1 The Contractor shall conduct an initial determination of employee lead exposures per task as required by the State of California, OSHA Construction Lead Standard [8 CCR 1532.1].

1.8.1.2 All Contractor and subcontractor employee categories shall be included in the exposure monitoring.

1.8.1.3 The duration of air monitoring shall be sufficient to provide a statistical confidence (95% upper confidence limit) that no employees are exposed above the lead "AL" or "PEL".

1.8.1.4 The results of the initial determination shall be used to establish the degree of engineering (barriers, two-stage, or three-stage containment), administrative and respiratory protection controls and the frequency of periodic exposure monitoring.

1.8.1.5 The results of the initial determination shall be reviewed and approved by the County of Fresno's Representative.

1.8.1.6 Results of employee exposure air sampling shall be compared to regulatory levels in place at the time of the sampling event.

1.8.2 Daily Employee Exposure Monitoring

1.8.2.1 Regardless of the results of the initial determination, the Contractor shall conduct daily employee exposure monitoring of not less than ten percent (10%) of the Contractors employees, or a minimum of two workers, representing the various tasks being performed.

Monitoring shall include those employees which are likely to have the highest exposure and shall be representative of the remaining workers.

1.8.2.2 Daily monitoring of the Contractor's employees shall be performed which will represent each employees exposure and shall not be of less than seven hours duration, unless shift is reduced, in which case monitoring shall represent entire shift.

1.8.3 Monitoring on behalf of County of Fresno:

1.8.3.1 County of Fresno's Representative may, at its discretion conduct initial and periodic area monitoring at the outside perimeter of the work area during the project. Cost of such sampling would be paid by County of Fresno.

1.8.3.2 Contractor shall conduct representative personal air sampling for each shift. Failure of Contractor to perform personal air sampling

operations to satisfaction of County of Fresno's Representative, or failure to provide laboratory results within 48 hours of sampling will allow County of Fresno's Representative to conduct independent personal air monitoring operations and to charge Contractor for cost of such operations including, but not limited to costs of shipping, on-site air sampling, and laboratory analysis.

1.8.3.3 The work area shall be considered to have four (4) sides for the purpose of this section. A minimum of two (2) air samples shall be collected: one (1) inside the work area and one (1) outside.

1.8.3.4 County of Fresno's Representative may collect baseline and pre-demolition dust wipe samples in order to determine pre and post demolition lead levels as part of the clearance process.

1.9 Work Stoppage

1.9.1 If, at any time, County of Fresno determines that work practices are violating pertinent provisions of this Contract, endangering workers, other contractors, or others, it will immediately notify the Contractor that operations shall cease until corrective action is taken and the Contractor shall take such corrective action before proceeding with the work.

1.9.2 Delays caused by inappropriate work practices as noted in these specifications and/or excessive concentrations shall be at the Contractor's expense. Threshold Limit Value - Short Term Exposure Limit (TLV-STEL) shall be according to the 1990-1992 Threshold Limit Values for

Chemical Substances and Physical Agents and Biological Exposure Indices (American Conference of Governmental Industrial Hygienists).

1.9.2.1 If these levels are exceeded, operations shall cease until County of Fresno's Representative determines that acceptable standards are met.

1.9.2.2 No later claims for extra compensation which result from action taken under this cause will be recognized by County of Fresno.

1.9.2.3 In case of disagreement between the County of Fresno and the Contractor regarding the analysis of any air monitoring data (initial, periodic, area, or employee exposure), the decision of County of Fresno will be regarded as final and conclusive. Differences in analytical results of up to a maximum of 30% shall be regarded as being substantially in agreement.

1.10 Site Security

1.10.1 The work site and surrounding areas may be subject to some degree of unauthorized entries, vandalism and theft. The Contractor shall plan to provide tight security for all work areas, storage areas and adjacent building areas which may be accessed through the work areas. All storage

areas containing hazardous materials including lead-based paint waste shall be fully enclosed and locked at all times when personnel are not present to oversee the material. All storage areas containing hazardous materials shall be clearly labeled as containing hazardous materials with signs in both English and Spanish.

1.10.2 Work involving disturbance of lead-based paint is to be restricted only to authorized, trained and protected personnel. These may include the Contractor's employees and representatives, state and local inspectors and any other designated individuals. A list of authorized personnel shall be established prior to job start and posted in the clean room of the worker decontamination facility and in the Contractor's work trailer or temporary office.

1.10.3 Contractor shall be notified by County of Fresno of any other authorized visitor prior to his/her entry to the job site.

1.10.3.1 Entry into the work area by unauthorized individuals shall be reported immediately to County of Fresno by the Contractor.

1.10.3.2 A log book shall be maintained in the clean room (area) of the worker decontamination system or Contractor's office. Anyone who enters any LEAD work area must record name, affiliation, time in and time out for each entry.

1.10.4 Access into the work area shall be through a worker decontamination system(s) located at the work site.

1.10.5 Contractor shall have control of site security during operations in order to protect work efforts and equipment.

1.10.6 During the course of the entire project, the lead qualified Contractor shall have a full-time foreman on-site during any period that lead related work is occurring. Foreman shall function as the Contractor's "Competent Person" and shall be a State of California, Department of Public Health Accredited Supervisor.

1.11 Emergency Planning

1.11.1 Emergency planning and procedures shall be developed by the Contractor and approved by County of Fresno's Representative prior to the commencement of work involving painted elements.

1.11.2 Emergency procedures shall be in written form and prominently posted. All employees must read and sign these procedures to acknowledge receipt and understanding of work site layout, location of emergency exits and emergency procedures.

1.11.3 Emergency planning shall include written notification of police, fire and emergency medical personnel of planned lead abatement activities, work schedule and layout of work area, particularly barriers that may affect response capabilities.

1.11.4 Emergency planning shall include considerations of fires, explosions, toxic atmospheres, electrical hazards, loss of electrical power, slips, trips and falls, confined spaces and heat related injuries. Written procedures shall be developed and employee training in procedures shall be provided.

1.11.5 Employees shall be trained in evacuation procedures in the event of workplace emergencies.

1.11.5.1 For non-life-threatening situations, employees injured or otherwise incapacitated shall decontaminate following normal procedures before exiting the workplace to obtain proper medical treatment.

1.11.5.2 For life-threatening injury or illness, worker decontamination shall take least priority. After taking measures to stabilize the injured worker, he/she shall be removed from the workplace and proper medical treatment secured.

1.11.5.3 In the event that evacuation procedures are required, the Contractor shall notify ambulance, paramedic personnel, the medical facility and any other required persons that the injured individual(s) is or may be contaminated with lead.

1.11.6 Emergency telephone numbers of all emergency response personnel shall be prominently posted in the clean room/change area and Contractor's office or trailer, and copies provided to COUNTY OF FRESNO and its Representative.

1.12 Pre-Construction Meeting

1.12.1 The Contractor shall attend a pre-construction job meeting at a time scheduled by County of Fresno. Attending this meeting will be representatives of

Contractor and Subcontractors impacted by abatement operations, and County of Fresno's Representative.

1.12.2 At this meeting, the Contractor and supervisory personnel who will provide on-site direction of the lead related activities must attend and be prepared to discuss:

1.12.2.1 Preparation of work area

1.12.2.2 Personal protective equipment including respiratory protection and protective clothing.

1.12.2.3 Employees who will participate in the project, including delineation of experience, training and assigned responsibilities during the project.

1.12.2.4 Decontamination procedures for personnel, work area and

equipment.

1.12.2.5 Lead abatement methods and procedures to be utilized.

1.12.2.6 Required air monitoring procedures.

1.12.2.7 Procedures for handling and disposing of waste materials.

1.12.2.8 Procedures for final decontamination and clean-up.

1.12.2.9 Detailed work and performance schedule.

1.12.2.10 Procedures for dealing with heat stress.

1.12.2.11 Emergency procedures.

PART 2 - PRODUCTS

2.1 General Requirements

2.1.1 All materials, tools, and equipment listed herein required shall be provided by the subcontractor.

2.2 Materials and Supplies

2.2.1 Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name, and labeling as required by 29 CFR 1910.1200, Hazard Communication Standard.

2.2.2 Store all materials that are subject to damage off the ground, away from wet or damp surfaces and under cover sufficient to prevent damage or contamination.

2.2.3 Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes contaminated with lead shall be disposed of in accordance with all applicable regulations.

2.2.4 Polyethylene Sheeting - Shall be fire resistant, 6 mil thickness, unless otherwise specified, in sizes to minimize the frequency of joints.

2.2.5 Tape - Capable of sealing joints of adjacent sheets of plastic sheets and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water.

2.2.6 Surfactant (wetting agent) - Detergent containing high phosphate levels (5%-10% solution).

2.2.7 Warning Labels and Signs - As required by OSHA Regulations, 29 CFR 1910.1025 and 8 CCR 1532.1. All warning signs provided for this project must be in both English and Spanish.

2.2.8 Encapsulant - Product shall have U.L. approval.

2.2.9 Other Materials - Provide all other materials as specified in drawings; also, other materials, such as lumber, nails and hardware, which may be required to construct and dismantle the decontamination area and the barriers that isolate the work area.

2.3 Tools and Equipment

2.3.1 Provide suitable tools for lead paint removal.

2.3.2 Type "Supplied Air System" - If a continuous flow or pressure-demand, supplied air respirator, NIOSH/OSHA certified is required to be available for workers:

The system shall meet all criteria prescribed by OSHA for supplied air respirators.

- The system shall have visual and audible alarms to warn of carbon monoxide levels in excess of 20 ppm.
- It also must be fully certified for hose length combinations up to 300 feet.
- Either half-mask or full-face piece units fitted with HEPA filter back-up units are acceptable.

2.3.3 Powered Air Purifying Respirator (PAPR) - A positive pressure device which employs a portable, rechargeable battery pack and blower to force contaminated air through a filter or cartridge, where the air is cleaned and supplied to the wearer's breathing zone. This respirator shall utilize HEPA filters and be either half-mask or full-face piece units.

2.3.4 Half-face air purifying respirator with canisters containing HEPA filters.

2.3.5 Full-face air purifying respirator with canisters containing HEPA filters.

2.3.6 Temporary electrical cords and outlets shall be of an approved type and connected to a source of power outside of the work area and protected by a ground fault circuit interrupter (GFCI).

2.3.7 All power shall be G.F.I equipped. The Contractor shall provide all equipment necessary to provide power into work area and to conduct work in a safe manner.

PART 3 - EXECUTION

3.1 Work Schedule

3.1.1 The work is to be carried out diligently to completion with utmost speed at each location where work is conducted. The Contractor shall complete all lead-related work in accordance with project schedule established for the project. In order to expedite the work, asbestos and lead related work may

be conducted simultaneously within the same containment area. Air monitoring shall be conducted for both asbestos and lead in accordance with Cal/OSHA requirements and these specifications.

3.1.2 All work performed under the contract shall be performed during hours stipulated by County of Fresno. Contractor shall fully cooperate with other Contractor's to expedite completion of the project.

3.1.3 If, in the opinion of County of Fresno it becomes necessary to work additional men for maintaining the schedule for the completion of any phase of the project within the specified time, the Contractor must immediately do so upon written request by County of Fresno.

3.1.4 Site work shall proceed in accordance with project schedule following review of the Contractor's LEAD "Compliance Plan" by County of Fresno's Representative.

3.2 Building Demolition Operations

3.2.1 During all demolition operations with intact lead-based or lead-containing paint, Contractor shall apply water continuously to portico to minimize airborne dust emissions. Portico elements shall be maintained in wetted condition while being impacted.

3.2.2 The Contractor shall conduct all demolition work in accordance with applicable Cal/OSHA regulations. The Contractor shall establish a regulated area and require that persons not properly trained and wearing proper PPE remain outside the regulated area at all times.

3.2.3 Contractor shall conduct representative personal monitoring for airborne lead during each and every work shift during which disturbance of lead occurs.

3.2.4 Contractor shall remove building debris from premises on a daily basis unless other arrangements are made with authorized representative of County of Fresno.

3.3 Inspections by County of Fresno's Representative

3.3.1 The County of Fresno's Representative shall inspect the site preparation work within the work site as outlined herein to ensure that work is conducted in accordance with these specifications and applicable regulations.

3.3.2 County of Fresno's Representative shall inspect the removal work and work area upon its completion to ensure that all visible Lead-Containing paint chips and residue have been removed. The Contractor SHALL NOT PROCEED with other work involving the site until such time as a final visual inspection has been conducted and the work and degree of cleanliness accepted by County of Fresno's Representative.

3.3.3 Prior to commencing work operations, County of Fresno's Representative may collect baseline soil samples and submit for analysis by accredited

laboratory as to lead content. Sampling locations shall be plotted on site plan.

3.3.4 Upon completion of work, the County of Fresno's Representative may conduct post renovation/demolition lead wipes and/or soil sampling as a condition of acceptance of work. If post demolition lead wipe and/or soil sampling documents that lead levels affected by the specified demolition operations are higher than baseline levels, Contractor shall remove and dispose of soil from the subject property as directed by County of Fresno's Representative to a depth that levels are at or below baseline lead levels and wet-wipe concrete surfaces. The Contractor shall be responsible for cost of cleaning concrete, soil removal, and disposal and cost of subsequent soil testing by County of Fresno's Representative. Contractor shall provide clean fill dirt to replace removed contaminated soil to previous soil level as directed by County of Fresno or County of Fresno's Representative.

3.3.5 All inspections and/ or re-inspections by the County of Fresno's Representative shall be scheduled by the Contractor at least twenty-four (24) working hours in advance.

3.3.6 County of Fresno's Representative will inspect the facilities as necessary, to ensure compliance with these specifications.

3.3.7 County of Fresno's Representative is not limited by the inspection requirements as noted above; additional safety and health inspections by County of Fresno's Representative may occur randomly, and in a manner to determine compliance with applicable laws and project design documents.

3.4 Preparation of Work Area

3.4.1 Work Area: Preparation

3.4.1.1 Contractor shall place 6 mil. plastic sheeting on ground around base of each structure prior to commencing work involving removal of loose or damaged paint chips, or removal of building elements with lead-based paint prior to demolition operations.

3.4.2 Signage: The Contractor shall post signs immediately outside all entrances and exits to the work area. Identical signage shall be posted in both English and Spanish.

3.4.2.1 The Contractor shall keep the signs posted until County of Fresno's Representative notifies the Contractor the specific area has successfully passed final visual inspection as herein defined.

3.4.2.2 The Contractor shall insure that the signage required meets the following description:

The sign is at least 20" by 14" and states the date and place of the lead abatement project;

The sign includes the phrase, “Caution - Lead Hazard, Keep Out” in bold lettering at least two inches high. Signage required by any regulatory agency having jurisdiction shall be posted at required locations.

3.5 Lead Disturbance Shall Not Commence Until:

3.5.1 The Lead Work Plan, and all required submittals and notices have been reviewed and approved by County of Fresno’s Representative.

3.5.2 Storage location at facility will be designated for temporary storage of lead paint chips and suspect lead-based paint containerized in steel drums with lockable lids.

3.5.3 Arrangements have been made for containing and/or disposal of wastewater resulting from lead related work activities.

3.5.4 Lockable dumpster or containers are inspected for leakage.

3.5.5 Tools, equipment and material waste receptacles are on-site.

3.5.6 All respirators are on-site and fully operative.

3.5.7 A visitor and employee sign-in sheet shall be maintained at the job site. All persons entering the site will be required to sign-in.

3.6 Clean-Up Procedures

3.6.1 General: When work involving the disturbance of lead is taking place, the work site shall be cleaned at the end of each day’s activities. Prior to beginning lead control, all stored materials or equipment shall be either removed to a “clean area” or wrapped in polyethylene prior to start of the lead related work. A secure area shall be designated at the site by County of Fresno’s Representative. The area shall be designated for storage of detached lead containing paint chips and contaminated articles until it can be properly disposed of. Disposable supplies such as mop heads, sponges, and rags shall be replaced regularly and disposed of according to the contract documents. Durable equipment, such as power and hand tools, generators, and vehicles shall be cleaned regularly. All equipment shall be cleaned by HEPA vacuuming and high-phosphate washing.

3.6.2 All clean-up procedures, as described herein, will be completed before the removal of the 6 mil thick area containment plastic sheeting on vents, as well as doorways to hallways and common areas.

3.6.3 Clean-Up Methods and Equipment: Areas in which operations involving disturbance of lead have been completed shall be cleaned, by vacuum cleaning using a high efficiency particulate air (HEPA) vacuum, followed by a wet cleaning with high-phosphate detergent wash. The Contractor may use a garden sprayer or equivalent to wet all surfaces with a 5% to 10% cleaning solution. After spraying the surface, a wet and dry HEPA vacuum

shall be used to vacuum the water from the surface.

3.6.4 High Efficiency Particulate Air (HEPA) Vacuum: The Contractor will obtain training in the use of the HEPA vacuum from the manufacturer prior to use. The Contractor shall obtain HEPA vacuum attachments, such as various sized brushes, crevice tools and angular tools to be used for varied application, and service the HEPA vacuum routinely to assure proper operation. Caution shall be taken any time the HEPA is opened for filter replacement or debris removal. Operators shall wear a full set of protective clothing and equipment, including Respirators when using the HEPA vacuuming equipment.

3.6.5 The Contractor shall retain the services of a testing laboratory to conduct representative sampling of wastewater (if any). Water which meets the local standards of the Regional Water Quality Control Board may be filtered and disposed of into the storm drain system after being filtered through a 4 micron filtering system. Water which contains over the allowable content of lead shall be disposed of as RCRA waste at the Contractors expense.

3.6.6 Removal of Plastic Sheeting: Plastic sheeting (if used) covering any floor surface shall be sprayed, picked up, and HEPA-vacuumed prior to removal. The plastic sheeting shall be carefully folded from the corners and ends toward the middle and placed into a double 4 mil or single 6 mil plastic bag and sealed. Bags shall be stored in the designated area and disposed of according to these specifications.

3.6.7 Final Clean-up and Inspection: The Contractor shall begin final clean-up after completion of all demolition related work and prior to application of replacement soil. The entire area shall be inspected for evidence of loose, detached paint chips and paint residue. All visible paint chips and paint residue shall be HEPA-vacuumed. No dry sweeping is allowed.

3.6.8 No statements in this section are meant to relieve the Contractor of his responsibility to meet the final clean-up criteria as established by these contract documents or any other applicable laws or regulations.

3.7 Clearance Testing and Standards

3.7.1 Following completion of the demolition operation clearance County of Fresno's Representative may collect representative soil and/ or wipe samples at the specified building site locations. Samples shall be submitted to an accredited laboratory for analysis as to lead content in accordance with these specifications.

3.7.2 Dust samples will be analyzed by a qualified laboratory utilizing atomic absorption spectroscopy. Sampling locations shall be at locations of baseline samples.

3.7.3 County of Fresno's Representative shall submit the test results indicating that the lead level in the tested soil and concrete area(s) are below allowable regulatory levels.

3.7.4 If the test results indicate higher levels, the Contractor shall wet-wipe concrete and/or remove soil from affected areas as directed by County of Fresno's Representative to depth sufficient to reduce lead levels to at or below baseline levels. Soil shall be stored in sealed containers for disposal. Contractor shall submit replacement soil samples to qualified laboratory to determine lead content for purposes of disposal.

3.7.5 Contractor shall replace removed soil with new clean fill and shall grade site. The Contractor shall submit copy of laboratory analysis documenting that replacement soil contains less than 400 ppm of lead. Soil removal, replacement, grading and subsequent soil sampling and analysis shall be provided at no cost to County of Fresno.

3.7.6 Contractor shall be responsible for all costs associated with delays, stoppages, and all costs associated with failure to meet clearance criteria for the initial sampling round per work area. Costs may include cost of repeating clearance sampling, laboratory costs, shipping, cost of County of Fresno's Representative, and incidental costs.

3.8 Disposal of Lead Waste Material

3.8.1 The Contractor shall dispose of all detached lead containing paint, chemical stripper, and articles contaminated by chemical stripper as RCRA waste.

3.8.2 Contractor shall provide all required testing to determine appropriate disposal of contaminated clothing, respirators, polyethylene, tape, P.P.E. and other contaminated articles.

3.8.3 All building elements with intact lead-based paint or lead-containing paint shall be disposed of as general construction debris. The Contractor shall comply with requirements of landfill for acceptance of lead-containing construction debris.

3.8.4 All lead contaminated wastewater shall be filtered and placed into steel drums. The Contractor shall retain the services of a testing laboratory to conduct representative sampling of wastewater. Water which meets the standards of the local Regional Water Quality Control Board, in addition to state and federal laws pertaining to water quality may be filtered and disposed of into storm drains. Water which contains over the allowable content of lead shall be disposed of as RCRA waste at Contractors expense.

END OF SECTION

SECTION 03 1000
CONCRETE FORMWORK

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02. SCOPE

A. The work required under this section consists of all concrete formwork and related items necessary and required to complete the work as indicated in the Contract Documents. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.

1.03. DESCRIPTION OF WORK

A. Work included: Provide formwork in accordance with the provisions of this section for all concrete shown on the Drawings or required by other Sections of these Specifications.

1.04. RELATED WORK SPECIFIED ELSEWHERE

A. Related Work in Other Sections: The following items of associated work are included in other sections of these specifications:

1. Excavating, filling, backfilling, and other earthwork operations (Division 2)
2. Furnishing and Placing of Reinforcing Steel (Division 3)
3. Cast-in-Place Concrete (Division 3)
4. Furnishing of anchor bolts and miscellaneous metal items to be embedded in concrete (Division 5 & Others)
5. Sitework Concrete (Division 2)

1.05. SUBMITTALS

A. General: Comply with pertinent provisions of Section 01340.

B. Manufacturers' data: Submit manufacturers' data and installation instructions for proprietary materials including form coatings, ties and accessories, and manufactured form systems if used.

1.06. REFERENCE STANDARDS

A. Standards: Comply with the following standards:

1. American Concrete Institute (ACI):
   a. ACI 347-04 Guide to Formwork for Concrete
2. International Code Council (ICC):
   a. Title 24, Part 2, California Building Code (CBC 2013 Edition)
3. West Coast Lumber Inspection Bureau (WCLIB):
   a. Standard Grading Rules for West Coast Lumber, No. 17, 2004 Edition
4. American Plywood Association (APA):
   a. Form V345 Design/Construction Guide: Concrete Forming

1.07. QUALITY ASSURANCE

A. Design of Formwork is the Contractor's responsibility.

PART 2 - PRODUCTS

2.01. FORM MATERIALS

A. Earth Forms: Use for footing only where soil is firm and stable and concrete will not be exposed. Where earth forms are used, cut excavations neat and accurate to size for placing concrete directly against the excavation.

B. Forms for Unexposed Concrete:

1. For concrete which will not be exposed in the finished work, and which are not otherwise scheduled or specified, use one of the following form materials:
   a. 6" or 8" wide, 1" nominal thickness boards with ship-lapped or tongue and groove edges conforming to WCLIB paragraph 118c for STANDARD grade Douglas Fir. Boards shall be S4S.
   b. 5/8" minimum thickness plywood conforming to APA grade marked B-B Plyform Class 1 Exterior.
2. For unexposed concrete below grade which is to receive membrane waterproofing use 5/8" minimum thickness plywood grade conforming to APA grade marked B-B Plyform Class 1 Exterior.

C. Forms for Exposed Surfaces:

1. General: For concrete which will be exposed in the finished work, except where otherwise scheduled or specified, use 5/8" "B-B Plyform Class 1 Exterior" grade plywood conforming to APA.
2. Plywood for standard architectural finish, concrete surfaces to receive a "rubbed" finish, and surfaces to receive membrane waterproofing shall be "B-B Plyform Class 1 Exterior" grade.
3. Plywood for smooth architectural finish shall be "HD Overlay Plyform Class 1 Exterior" grade.

D. Round Column Forms:

1. Prefabricated seamless fiber forms.
2. Premium Sonotube Fiber Form.

E. Form Ties:

1. Provide factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal.
2. Provide ties so that portion remaining within concrete after removal of exterior parts is at least 1 1/2' from the outer concrete surface. Provide form ties which will not leave a hole larger than 1" diameter in the concrete surface.

F. Forms Coatings:

1. Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces requiring bond or adhesion, not impede the wetting of surfaces to be cured with water or curing compounds.

2.02. DESIGN OF FORMWORK

A. General:

1. Design, erect, support, brace, and maintain formwork so that it will safely support vertical and lateral loads that might be applied, until such loads that might be applied can be supported by the concrete structure. The design and engineering of the formwork shall be the responsibility of the contractor.
2. Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose.
3. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position.
4. Design forms to include assumed values of live load, dead load, wind load, seismic load, weight of moving equipment operated on formwork, concrete mix, height of concrete drop,

vibrator frequency, ambient temperature, foundation pressures, allowable stresses, lateral stability, and other factors pertinent to safety of structure during construction.

5. Provide shore and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations using wedges or jacks or a combination thereof.
6. Support form facing materials by structural members spaced sufficiently close to prevent objectionable deflection. Limit deflection of facing materials reflected in concrete surfaces exposed to view to 1/240 of the span.
7. Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities, and within allowable tolerance.
8. Provide camber in formwork as required for anticipated deflections due to weight and pressures of fresh concrete and construction loads.
9. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and runs.

B. Tolerances and Variations: The Contractor shall Set and maintain concrete forms to ensure that, after removal of the forms and prior to patching and finishing, no portion of the concrete work will exceed any of the tolerances specified. The Contractor shall be responsible for variations due to deflection, when die latter results from concrete quality or curing other than that which has been specified. The tolerances specified shall not be exceeded by any portion of any concrete surface; the specified variation for one element of the structure will not be applicable when it will permit another element of the structure to exceed its allowable variations. Except as otherwise specified herein, tolerances shall conform to ACI 347.

C. Earth Forms:

1. Side forms of footings may be omitted, and concrete placed directly against excavation only when requested by the Contractor and reviewed by the Architect. When omission of forms is reviewed, provide additional concrete 1" on each side of the minimum design profiles and dimensions shown. Wood edge strips shall be provided at the top on each side of the excavation to secure reinforcing and to prevent soil from sloughing into the excavation. Earth forms shall be tamped firm and clean of all debris and lose material before depositing concrete.

PART 3 - EXECUTION

3.01. SURFACE CONDITIONS

A. Examine the substrate and conditions under which work of this Section is to be performed, and correct unsatisfactory conditions which would prevent proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02. FORM CONSTRUCTION

A. General:

1. Construct forms complying with ACI 347, to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, level, and plumb work in finish structures.
2. Provide for openings, offsets, sinkage, keyways, recesses moldings, relets, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features required. Use selected materials to obtain required finishes.
3. Forms for openings, and construction which accommodates installation by other trades whose materials and products must be fabricated before the opportunity exists to verify the measurements of adjacent construction which affects such installations, shall be accurately sized and located as dimensioned on the drawings. In the event that deviation from the Drawing dimensions results in problems in the field, the Contractor shall be responsible for resolution of the conditions without additional expense to the Owner.

B. Fabrication;

1. Fabricate forms for easy removal without hammering or prying against concrete surfaces.

2. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Kerf wood inserts for forming keyways, relets, recesses, and the like to prevent swelling and assure ease of removal.
3. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Brace temporary closures and set tightly to temporary openings on forms in as inconspicuous locations as possible, consistent with design requirements. Form intersecting planes to provide true, clean cut corners.

C. Forms for Exposed Concrete:
1. Forms for architectural concrete shall be designed to produce the required finish or finishes. Deflection of facing materials between studs as well as deflection of studs and walers shall be limited to 0.0025 times the span or as otherwise specified. Forms shall be designed to permit easy removal. Prying against the face of the concrete shall not be allowed. Only wooden wedges shall be used.
2. Where natural plywood form finish, grout cleaned finish, smooth rubbed finish, scrubbed finish, or sand floated finish is required, forms shall be smooth (faced with plywood, liner sheets, or prefabricated panels) and true to line, in order that the surfaces produced will require little dressing to arrive at true surfaces. Where any as-cast finish is required, no dressing shall be permitted in the finishing operation.
3. Whereas-cast surfaces, including natural plywood form finish, are specified, the panels of material against which concrete is cast shall be orderly in arrangement, with joints between panels planned in acceptable relation to openings, building corners, and other architectural features.
4. Where panels for as-cast surfaces are separated by recessed or otherwise emphasized joints, the structural design of the forms shall provide for locating form ties, where possible, within the joints so that patches of tie holes will not fall within the panel areas.
5. In addition to shop drawings normally required, fabricating drawings of forms for architectural concrete shall be submitted for acceptance showing the jointing of facing panels, the locations of form ties, and any necessary alignment bracing.
6. Forms shall not be reused if there is any evidence of surface wear and tear or defect which would impair the quality of the surface. Forms shall be thoroughly cleaned and properly coated before reused.
7. Formwork for architectural concrete shall be observed continuously while concrete is being placed to see that there are no deviations from desired elevation, alignment, plumbness, or camber. If, during construction, any weakness develops and the falsework shows any undue settlement or distortion, the work shall be stopped, the affected construction removed if permanently damaged, and the falsework strengthened.
8. All cracks and openings in formwork joints larger than 1/8" shall be filled with crack filler.

D. Corner Treatment: Unless shown otherwise, form chamfers with 3/4" x 3/4" strips, accurately formed and surfaced to produce uniformly straight lines and tight edge joints on exposed concrete. Extend terminal edges to required limit and miter chamfer strips at changes in direction.

E. Provision for Outlier Trades: Provide openings in concrete formwork to accommodate work of other trades. Verify size and location of openings, recesses and chases with the trade requiring such items. Accurately place and securely support items to be built into forms.

F. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces 10 receive concrete. Remove chips, wood, sawdust, diii, and other debris just before concrete is placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

G. Screeds: Set screeds and establish levels for tops of concrete slabs and leveling for finish on slabs. Shape slabs to drain where required or as indicated on drawings.

H. Screed Supports: For concrete over waterproof membranes and/or vapor-barrier membranes, use cradle, pad, or base type which will not puncture the membrane. Do not stake through membrane.

I. Edge Forms and Screeds Strips for Saabs: Set edge forms or bulkheads and intermediate screed

J. Strips for slabs to obtain required elevations and contours in the finished sib surface. Provide and secure units to support types of screeds required. Slope floors uniformly to drains and depress slabs at tile floors.

3.03. FORM COATINGS:

A. Coat form contact surfaces with form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with surfaces which will be bonded to fresh concrete.

3.04. INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

B. Coordination: All contractors whose work is related to the concrete, or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.

C. Anchorage: Expansion joint material, water stops, and other embedded items shall be positioned accurately and supported against displacement, prior to placing concrete. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

D. Anchor Bolts: Anchor bolts shall be set to templates, shall be plumbed carefully and checked for location and elevation with an instrument, and shall be held in position rigidly to prevent displacement before concrete is placed.

3.05. REMOVAL OF FORMS

A. General:

1. When repair of surface defects or finishing is required at an early age, forms shall be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.
2. Top forms on sloping surfaces of concrete shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and be followed by the specified curing.
3. Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.
4. Formwork for columns, walls, sides of beams, sides of slabs on grade and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.
5. Forms and shoring in the formwork used to support die weight of concrete in beams, slabs, and other structural members shall remain in place until the concrete has reached the specified 28 day compressive strength.

B. Removal Strength:

1. Although forms may be removed as specified above, members may be loaded only after the minimum design strengths as specified on the drawings are attained. Any request for earlier removal of forms and shoring shall be made to the Architect in writing, along with supporting evidence that the safety of the structure will not be impaired.
2. When removal of formwork is based on the concrete reaching a specified strength, the concrete shall be presumed to have reached this strength when either of the following conditions has been met.
   a. When test cylinders, field cured along with the concrete they represent, have reached the strength specified for removal of formwork. Except for the field curing and age at test, the cylinders shall be molded and tested as specified in ASTM 01.

b. When the concrete has been cured for the same length of time as the age attest of Laboratory-cured cylinders which reached the specified strength. The length of time the concrete has been cured in the structure shall be determined by a cumulative number of days or fractions thereof, not necessarily consecutive. During which the temperature of the air in contact with the concrete is above 50 °F and the concrete has been damp or thoroughly sealed from evaporation and loss of moisture.

C. Removal:

1. In removing plywood forms, no metal pinch bars shall be used and special care shall be taken in stripping. Start at top edge or vertical corner where it is possible to insert wooden wedges. Wedges shall be done gradually and shall be accompanied by light tapping on the plywood panels to crack them loose. Do not remove forms with a single jerk after it has been started at one end.
2. Forms shall be left in place as long as possible to permit shrinkage away from concrete, and plywood forms shall be left in place until all other forms around are stripped, and until there is no danger of damaging the architectural concrete due to ot1er work in the vicinity.

D. Protection: After stripping, Contractor shall properly protect all concrete to be exposed in the finish work from drainage, with boards and non-staining building paper to prevent staining, spalled edges, chips, etc.

3.06. RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in the Work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete surfaces as specified for new formwork. When forms are reused for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to dose all joints. Align and secure joints to avoid offsets.

3.07. FIELD QUALITY CONTROL

A. The Contractor shall notify the Architect 48 hours prior to placing of any concrete, and after placement of reinforcing steel in the forms.

B. Rejection of Defective Work Due to Improper Forms: Any movement or bellying of forms during construction or variations in excess of the tolerances specified will be considered just cause for the removal of such forms and, in addition, the concrete work so affected. Reconstruction of forms and new concrete shall be furnished at no additional cost to the Owner.

END OF SECTION

SECTION 03 2100
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02. SCOPE

A. The work required under this section consists of all reinforcing steel and related items necessary and required to complete the work as indicated in the Contract Documents. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.

1.03. DESCRIPTION OF WORK

A. Steel reinforcing required for reinforcement of concrete and masonry is shown on the drawings.

1.04. RELATED WORK SPECIFIED ELSEWHERE

A. Related Work in Other Sections: The following items of associated work are included in other sections of these specifications:
   1. Portland Cement Concrete Paving (Division 2)
   2. Concrete Formwork (Division 3)
   3. Cast-in-Place Concrete (Division 3)
   4. Concrete Unit Masonry (Division 4)
   5. Structural Steel (Division 5)

1.05. SUBMITTALS

A. Mill Certificates:
   1. The contractor shall provide Mill Certificates for each size of bar and for each heat to be used on the project. Certificates shall be in accordance with the requirements of Part 1.06, “Reference Standards” of this specification section.
   2. Mill Certificates shall include the name of mill, date of rolling, date of shipping to fabricator, and shall be signed by fabricator certifying that each material complies or exceeds the specified requirements. A Mill Certificate shall be furnished with each lot of material delivered to the project, and the lot shall be clearly identified in the Certificate.

B. Shop drawings shall be submitted to the Architect and the Structural Engineer for reviews as per the General Conditions. No fabrication shall be commenced before receiving the Structural Engineer's review of Shop Drawings.
   1. Shop drawings shall show bar schedules, stirrup spacing, diagrams of bent bars, and arrangement and assemblies.
   2. Make Shop Drawings in accordance with ACI SP-66 or CRSI Manual of Standard Practice.

C. Welding Affidavit: The welding inspector shall furnish the Architect with an affidavit stating that all welding has been performed in compliance with the drawings and specifications and all work has been accomplished by certified welders.

1.06. REFERENCE STANDARDS

A. Comply with the pertinent provisions of the following codes and standards:
   1. American Society for Testing and Materials (ASTM):
      a. A82 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

b. A185 Standard Specification for Welded Steel Wire Fabric, Plain, for Concrete Reinforcement.
c. A615 Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement, including supplementary requirement S1.
d. A675 Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties.
e. A706 Standard Specification for Low Alloy Steel Deformed Bars for Concrete Reinforcement.

2. International Code Council (ICC):
   a. Title 24, Part 2, California Building Code (CBC 2013 Edition)
3. American Welding Society (AWS):
   a. D1.4:2005
   b. Structural Welding Code - Reinforcing Steel
4. American Concrete Institute (ACI):
   a. 117-10 Standard Tolerances for Concrete Construction and Materials.
   b. SP-66 Detailing Manual
   c. 318-08 Building Code Requirements for Reinforced Concrete
5. Concrete Reinforcing Steel Institute (CRSI):
   a. Manual of Standard Practice
6. Wire Reinforcing Institute (WRI)
   a. Manual of Standard Practice

1.07. SAMPLES AND TESTS

A. In the absence of Mill Certificates and heat numbers for the delivered reinforcement, the Contractor shall hire a Testing Agency to verify compliance and provide lab test reports. Testing of reinforcement shall be provided in accordance to the requirements of Part 1.06, “Reference Standards” of this specification section.

B. Tests shall be performed by an Engineering Testing Agency approved by the Architect. The Testing Agency shall select such samples as may be required for tests.

C. The Testing Agency shall furnish copies of the results of testing activities in the form of reports showing: (1) Result of test, (2) Stating that they were made in accordance with provisions of these specifications, and (3) whether materials are satisfactory in accordance with these specifications.

D. The Contractor shall identify each lot of fabricated reinforcing steel to be shipped to the site by assigning an individual lot number that identifies steel by heat number, and shall be tagged in such a manner that each such lot can be accurately identified at the job site.

E. Samples for physical tests of reinforcing steel shall be taken by a representative of the Testing Agency at the point of distribution in the State of California, prior to shipment to the building site, or at the building site. If taken at the point of distribution, positive identification shall be provided. If taken at the building site, they shall be taken in the presence of the Architect, Structural Engineer or his representative. Samples shall consist of not fewer than two (2) pieces, each eighteen (18) inches long of each size and kind of reinforcement steel as indicated in the testing schedule.

F. Costs of tests (except as called for in the following paragraph) shall be borne by the Owner.

G. Where a particular test specimen has failed to comply with the requirements of the specifications, the cost of any check test required by the Architect or the Structural Engineer shall be borne by the Owner and deducted from the contract price.

PART 2 - MATERIALS

2.01. REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Galvanized Reinforcing Bars: ASTM A 767, Class II (2.0 oz. zinc psf) hot-dip galvanized, after fabrication and bending.

C. Epoxy-Coated Reinforcing Bars: ASTM A 584.

D. Steel Wire: ASTM A 82, plain, cold-drawn steel.

E. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

F. Welded Deformed Steel Wire Fabric: ASTM A 1064

G. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

H. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

I. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

J. Reinforcing to be welded shall be ASTM A706 Grade 60.

PART 3 - EXECUTION

3.01. GENERAL

A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.02. BENDING REINFORCEMENT

A. Steel reinforcement shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the plans shall not be used.

B. Bends for stirrups and ties shall be made around a pin having a diameter not less than two times the minimum thickness of the bar. Bends for other bars including hooks, shall be made around a pin having a diameter not less than six times the minimum thickness of the bar, except that for bars larger than one inch, the pin shall be not less than eight times the minimum thickness of the bar. All bars shall be bent cold.

3.03. PLACING OF REINFORCEMENT

A. The minimum center to center distance between parallel bars shall be 1-1/2 times the diameter for round bars, but in no case shall the clear spacing between bars be less than 1-1/2 inches nor less than 1-1/3 times the maximum size of the coarse aggregate.

B. Bars shall be accurately placed as shown on the plans and shall be firmly and securely held in position by wiring at all intersections, using #16 annealed wire and such necessary supporting wires and concrete or metal chairs as shall thoroughly support the reinforcing steel in its position. No wooden or masonry supports for reinforcing shall be allowed. Placing bars on layers of fresh concrete will not be permitted.

C. No concrete shall be deposited until the Structural Engineer has inspected the placing of reinforcing steel and given approval of same and the permission to proceed with the pouring of the concrete.

D. Beams and girder bars shall be supported by approved wire chairs, one to be placed not more than 2'-0" from each support and intermediate chairs to be placed not more than 6'-0" on centers.

E. Slab bars shall be supported by approved wire chairs placed not more than 2'-0" from each support and then not more than 2'-0" on centers. Top bar shall be supported by high chairs placed not more than 3 inches from face of supports and individual chairs shall be spaced not more than 2'-0" on centers in the direction of the spacer bars.

F. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

G. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.

H. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

I. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

J. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction. See Drawings for special requirements.

3.04. CONCRETE COVERAGE OF REINFORCING

A. All dimensions shown for location of reinforcing steel are to face of bar and denote clear coverage. For beams and tied columns, dimensions are to main bars, unless specifically noted. Concrete coverage shall be as follows:

1. 3" where concrete is deposited directly against ground
2. 2" where concrete is exposed to ground but placed in forms.
3. 2" for main bars of tied columns.
4. 1-1/2" for main bars of beams.
5. 1-1/2" to face of spiral for spiral wrapped columns.
6. 1" for wall bars unless otherwise shown.
7. 3/4" for bars in slabs on forms
8. 2" for slabs over vapor barrier (or as detailed).

3.05. SPLICES IN REINFORCEMENT

A. Splices in continuous reinforcing as used in walls, wall footings, etc., shall have a lap as detailed on the Structural Drawings, but in no case less than 24 diameters, 1'-6" minimum, and the splices in adjacent bars shall be not less than 5'-0" apart. Splices shall occur where detailed. Vertical wall bars may be spliced at or near the floor lines unless detailed otherwise. Bars may be wired together at splices or laps except at top reinforcing of beams or slabs or where definitely detailed to be separated.

B. Splices of reinforcement in slabs, beams, and girders shall not be made at points of maximum stress; splices shall provide sufficient lap to transfer stress between bars by bond and shear. Where column cross-section changes, longitudinal bars shall be offset in region where lateral support is afforded, see structural details. Slope of offset bars shall not exceed 1 in 6.

3.06. MISCELLANEOUS REQUIREMENTS

A. All steel dowels (including dowels for masonry work) must be placed before the concrete is poured and shall be held in proper position and alignment. Wherever conduits, piping, insets, sleeves, etc., interfere with the placing of reinforcing steel as shown or called for, the Contractor shall consult the Structural Engineer and secure in writing, the method of procedure before pouring any concrete.

3.07. CLEAN UP

A. All debris and/or rubbish resulting from the operation of this trade shall be cleaned up and removed from the site as the work progresses.

PART 4 - FIELD QUALITY CONTROL

4.01. The placement of all reinforcing shall be inspected by the Project Inspector prior to

placement of concrete.

4.02. Inspection of Welded Reinforcing Bars:

A. Inspection of all shop and field structural welding operations shall be made by a qualified welding inspector, designated by the Architect and approved by the Division of the State Architect. Such inspector shall be trained and thoroughly experienced in inspecting reinforcing bar welding operations. The inspector's ability to distinguish between sound and unsound welding shall be reliably established.

B. The welding inspector shall make a systematic record of all welds. This record shall include:
   1. Identification marks of welders.
   2. List of defective welds.
   3. Manner of correction of defects.

4.03. REPORTS

A. Submit reports of welding inspection to Project Inspector & Architect.

END OF SECTION

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SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.

1.02. SCOPE:

A. The work required under this section consists of all cast in place structural concrete work and related items necessary and required to complete the work as indicated in the Contract Documents. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.

1.03. DESCRIPTION OF WORK

A. Work Included: Provide all cast-in-place concrete for buildings and structures, complete, in place, as indicated on the Drawings, specified herein, and as required for a complete and proper

1.04. RELATED WORK SPECIFIED ELSEWHERE

A. Related Work in Other Sections: The following items of associated work are included in other sections of these specifications:
   1. Sitework Concrete (Division 2)
   2. Sleeves for mechanical and electrical items (Divisions 15 & 16)
   3. Concrete Formwork (Division 3)
   4. Anchors and miscellaneous metal items to be embedded in concrete (Division 5 and others)
   5. Concrete reinforcement (Division 3)
   6. Under floor vapor barrier (Division 7)

1.05. SUBMITTALS

A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
   1. Cement: Submit manufacturer's Certificate of Compliance and affidavit for cement.
   2. Aggregate: Submit Certificate of Compliance and grading analysis of each aggregate proposed. Submit proposed combined grading for each mix to be used.
   3. Manufacturer’s Certificate of Compliance and catalog sheets including instructions for use and description of application shall be submitted for each of the following materials: Epoxies, Admixtures, Curing Compounds, Chemical Hardener, and Moisture Barriers.
   4. Shop Drawings: Submit shop drawings showing location of construction and control joints other than as indicated on the drawings.
   5. Test Reports: Submit reports of tests hereinafter required to Engineer.
   6. Concrete Mix Designs: Submit proposed concrete mix designs for all types and uses of concrete. Include water/cement ratio, size of coarse aggregate, and amount of any admixture. Predict the minimum compressive strength, maximum slump, and air content percentage.
   7. Delivery Tags: Submit copies of delivery tags for all concrete.
   8. Shrinkage-resistant grout.

1.06. REFERENCE STANDARDS

A. **Codes and Standards:** Comply with applicable provisions of the following codes and standards:
   1. International Code Council (ICC):
      a. Title 24, Part 2, California Building Code (CBC 2022 Edition)

b. Uniform Building Code Standards

2. American Concrete Institute (ACI):
   a. ACI 211.1-91 Standard Practice for Selecting Proportions for Normal and Heavyweight Concrete.
   b. ACI 214R-11 Recommended Practice for Evaluation of Strength Test Results of Concrete
   c. ACI 304R-00 Guide for Measuring, Mixing, Transporting, and Placing Concrete
   d. ACI 305R-10 Hot Weather Concreting
   e. ACI 306.1-90 Standard Specification for Cold Weather Concreting
   f. ACI 308.1-11 Standard Practice for Curing Concrete
   g. ACI 309R-05 Guide for Consolidation of Concrete
   h. ACI 318-11 Building Code Requirements for Reinforced Concrete
   i. SP-2 Manual of Concrete Inspection
3. American Society for Testing and Materials (ASTM): The specifications and standards hereinafter referred to are the latest editions, except when year is specified.
   a. C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   b. C33 Standard Specification for Concrete Aggregates.
   c. C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
   d. C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
   e. C88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
   f. C94 Standard Specification for Ready- Mixed Concrete
   g. C143 Standard Test Method for Slump of Portland Cement Concrete
   h. C150 Standard Specification for Portland Cement
   i. C171 Standard Specification for Sheet Materials for Curing Concrete
   j. C172 Standard Method of Sampling Freshly Mixed Concrete
   k. C173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
   l. C192 Standard Method of Making and Curing Concrete Test Specimens in the Laboratory
   m. C227 Test Method for Potential Reactivity of Cement- Aggregate Combinations (Mortar-Bar Method)
   n. C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
   o. C260 Standard Specifications for Air-Entraining Admixtures for Concrete
   p. C309 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
   q. C494 Standard Specification for Chemical Admixtures for Concrete
   r. C618 Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolans for Use in Portland Cement concrete
   s. D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural construction (Non-extruding and Resilient Bituminous Types)
   t. D2103 Polyethylene Film and Sheeting
   u. E1155 Standard Test Method for Determining Floor Flatness and Levelness Using the F-Number System
4. Provisions of California Building Code, Title 24, Part 2 are applicable to the work. When requirements of such codes are at variance with requirements specified in foregoing paragraph, the provisions of California Building Code shall take precedence.

1.07. QUALITY ASSURANCE

A. The Contractor shall provide Certificates of Compliance for concrete materials in accordance with the requirements of Part 1.05, “Reference Standards” of these specifications. When Certificates of Compliance cannot be provided, laboratory test reports shall be provided in accordance with the requirements of Part 1.05, “Reference Standards” of these specifications.

B. All materials and work shall be subject to inspection at the batch plant, and at the building site. Material or workmanship not complying fully with the approved drawings, and /or specifications shall be rejected.

C. Continuous inspection shall be maintained at the batch plant and for transit-mixed concrete to check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.

D. Continuous batch plant inspection may be waived by the Structural Engineer in responsible charge, subject to approval by the enforcement agency, when the concrete plant can show that it complies with the requirements of ASTM C94, Sections 8 and 9, and has a current certificate from the National Ready Mixed Concrete Association or another agency acceptable to the enforcement agency. The certification shall indicate that the plant has automatic batching and recording capabilities.

E. When continuous batch plant inspection is waived, the following requirements shall apply:

1. Qualified technician of the testing agency shall check the first batch at the start of the day.
2. Licensed weight master to positively identify materials as to quantity and certify to each load by a batch ticket.
3. Batch tickets, including actual material quantities and weights shall accompany the load and shall be transmitted to the inspector of record by a truck driver with load identified thereon. The load shall not be placed without a batch ticket identifying the mix. the inspector will keep a daily record of placements, identifying each truck, its load, time of receipt, and approximate location of deposit in the structure and will transmit a copy of the daily record to the enforcement agency.

1.08. TESTS AND SAMPLES

A. If Certificates of Compliance for materials are not provided, the approved Engineering Testing Agency shall perform the tests as hereinafter required. The Contractor shall furnish the testing engineer with such samples as may be required for the tests. Tests shall be paid for by the Owner.

B. Test cement as per applicable referenced specification under which it is furnished. Cement shall be sampled either at mill or site. Free access shall be given to all points where concrete materials are stored, proportioned or mixed and all equipment and methods used shall be subjected to inspection, test and approval. Do not use cement until authorized. Retest before using cement which has been stored, other than at bins in mills, for over 4 months after being tested. Ordinarily, use no cement until after it has passed both 7 and 28-day tests; Structural Engineer may waive 28-day tests, providing it is a product of quarry or mill with reputation of at least 3 years standing for production of high-grade cement. Remove cement delivered to job, later found under test to be unsuitable. There shall be at least one test for each 500 barrels of cement. Cement from approved test bins is acceptable providing certified tests reports are furnished.

C. Test aggregate as per ASTM, C-33. Fine aggregate shall be tested for organic impurities per ASTM, C-40. Tests shall be paid for by the Owner.

D. CONCRETE:

1. Strength Tests of Cylinders During Work--- Provide for test purposes 1 set of 4 cylinders each taken from each 50 cu. yds. or fraction thereof, or each day's pour, whichever is less, of all concrete placed. Test one at 7 days; two at 28 days. Make and cure-test cylinders as per ASTM, C-31. Cure specimens under laboratory conditions except that Structural Engineer may require curing under field conditions when there is a possibility of air falling below 40^0F or where strengths at less than 28 days are important. Test cylinders as per

ASTM, C-39. Standard ages of tests shall be 7 to 28 days. When concrete strengths show proper consistency, 7 day tests may be discontinued.

a. If strength tests of cylinders falls below specified compressive strengths at 28 days, Structural Engineer reserves right to order change in proportion or water content of concrete, or both, for remaining portions of job and/or require core tests on that portion of the work wherein the weak concrete was used. The Owner shall bear the full costs for further tests and the Contractor shall be back charged.

b. Core tests as per ASTM, C-42 shall be secured by the testing laboratory under the direction of the Architect or Structural Engineer. If the compressive tests of the core specimens fail to show the compressive strength specified, the concrete will be deemed defective and shall be removed and replaced or adequately strengthened in a manner acceptable to the Architect and Structural Engineer.

E. Slump Test: In field, determine consistency by slump test as per ASTM, C-143. The slump shall be 4 inches plus or minus 1 inch.

PART 2 - PRODUCTS

2.01. CEMENT

A. Cement shall be a standard brand of Portland Cement complying with ASTM C-150 Type II.

B. Use only one brand of cement for exposed concrete work.

C. Do not use cement reclaimed from cleaning bags or leaking containers.

D. Use cement in sequence of receipt of shipment.

2.02. CONCRETE AGGREGATES

A. Concrete aggregates shall conform to ASTM C-33. The sieve used in the sieve analysis shall be square mesh wire cloth.

B. Fine Aggregates: Fine Aggregates shall consist of washed natural sand having hard, strong and durable particles. Fine aggregate shall be graded uniformly from fine to coarse and when combined with the coarse aggregate shall meet the requirements of the following table.

C. Coarse Aggregate: Coarse aggregate shall consist of clean, hard, fine-grained, sound crushed rock or washed gravel, or combination of both, which does not contain in excess of five (5) percent by weight of flat, chip-like, thin, elongated, friable, or laminate pieces, or more than to (2) percent by weight of shale or cherty material. It shall be free from all organic matter or other deleterious substances. Any pieces having a major dimension in excess of two and one-half (2-1/2) times the average thickness shall be considered to be flat or elongated.

D. Aggregate shall be uniformly grated from one-quarter (1/4) inch size to maximum size. The combined grading shall be such that the percentage by weight of the combined aggregates shall fall within the limits established by the following table:

GRADING OF COMBINED AGGREGATES

Percentage by Weight

Sieve Number of Size in Inches	1-1/2" Max.	1" Max.	3/4" Max.
Passing a 1-1/2"	95-100		
Passing a 1"	75-90	90-100	
Passing a 3/4"	55-77	70-90	90-100
Passing a 3/8"	40-55	45-65	60-90
Passing a No. 4	30-40	31-47	40-60
Passing a No. 8	22-35	23-35	30-45
Passing a No. 16	16-30	17-35	20-35
Passing a No. 30	10-20	10-23	13-23

Passing a No. 50	**2-8**	**2-10**	**5-15**
Passing a No, 100	**0-3**	**0-3**	**0-5**

E. Storage and Measurement: Fine and coarse aggregate shall be stored and measured separately. In case the maximum size of coarse aggregate is greater than one inch, that portion ranging between one-quarter inch, and three quarters of one inch, shall be stored and measured separately from the remained of the coarse aggregate.

F. The maximum size of coarse aggregate shall be no larger than 1/5 the narrowest dimension between sides of forms, 1/3 the depth of slabs, or 3/4 the minimum clear spacing between individual reinforcing bars or wires, bundles of bars, individual tendons, or ducts. Maximum size of coarse aggregate shall also be no larger than one and one-half (1-1/2) inches, except for walls 12" or less in thickness, in which case maximum size shall be 1".

2.03. WATER

A. Water shall be clean, and free from oil, acid and injurious amounts of vegetable matter, alkalies or other salts and shall conform to ASTM C 1602.

2.04. ADMIXTURES

A. Admixtures for concrete may be used only when approved by the Structural Engineer, OSHPD and the Testing Laboratory. Submit complete Manufacturer's data for consideration.

2.05. HARDENING SEALER

A. Where indicated dust proofing hardener material shall be a liquid chemical placed as per manufacturer's specifications.

1. Available Manufacturers: "Seal Hard", L & M Construction Chemicals Inc., or approved equal.

2.06. ABRASIVE GRIT

A. Abrasive grit, where indicated shall be crystalline alumina grains No. 12-30 grit.

2.07. CURING MATERIAL

A. Curing Materials: Provide one of the following:

1. Reinforced waterproof paper type 2, Sis/Kraft Orange Lable, or Architect approved equal.
2. Liquid-Membrane Forming Curing Compound: Complying with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Moisture loss not more than 0.055 gr./sq. mc. when applied at 200 sq. ft./gal.
3. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
   a. "Masterseal"; Master Builders.
   b. "Clear Seal"; A.C. Horn.
   c. "Spartan-Cote"; The Burke Co.
   d. "Kure-N-Seal"; Sonneborn-Contech.
   e. "LR-152"; Protex Industries.
   f. "Sealtight 1300-Clear"; W.R. Meadows.
   g. "Sealtight 2100-Clear"; W.R. Meadows.
   h. "L & M Cure"; L & M Construction Chemicals Inc.

2.08. BONDING

A. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
   a. "Weldcrete"; Larsen Products.
   b. "Hornweld"; A.C. Horn.
   c. "Sonocrete"; Sonneborn-Contech.

d. "Acrylic Bondcrete"; The Burke Co.

2.09. EPOXY

A. Epoxy Adhesive: ASTM C 881, two component materials suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
   a. "Epoxtite"; A.C. Horn.
   b. "Sikadur Hi-Mod"; Sika Chemical Corp.
   c. "Patch and Bond Epoxy"; The Burke Co.

2.10. SPECIAL FLOOR HIGH STRENGTH ADDITIVE

A. Concrete floors 2" thick or less, spot patching of concrete and "feathering" of concrete floors to be finished with non-metallic aggregate hardener were shown on the drawings and/or listed on the floor finish schedule, shall receive "Master Builders Mastercron Aggregate, in natural concrete color.

2.11. EXPANSION JOINT FILLER AND SEALANT

A. General: Filler and sealant to be per Division 7. If not indicated in Division 7 provide as indicated below.

1. Filler - non-bituminous, non-extruding, pre-molding wood fiber, conforming to ASTM D 1751, as "Homex 300" by Homasote Company or approved equal.
2. Sealant (where indicated) - self-leveling, pourable polyurethane as Sonneborn Sonolastic Paving joint sealant or approved equal, placed as per manufacturer's specifications, color selected by Architect.

2.12. DRYPACK

A. Drypack for bedding steel bearing plates and wood sills shall be one part cement to two parts concrete sand by volume. Amount of water shall be just sufficient to make a workable mix.

2.13. NONSHRINK GROUT

A. Nonshrink grout shall be pre-mixed, high strength, flowable grout which does not shrink as it cures. Nonshrink grout shall attain a minimum compressive of 5000 psi at 7 days. Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to the following:

1. Metallic:
   a. Embeco 636; Master Builders
   b. Sikagrout 212; Sika Chemical Company.
2. Non-Metallic:
   a. Masterflow 928; Master Builders
   b. Sonogrout 10K; Sonneborn-Contech.

2.14. STORAGE OF MATERIALS

A. Cement: Immediately upon receipt on job or at plant, store cement in dry, weather-tight properly ventilated structure, with adequate provisions to prevent moisture absorption.

B. Aggregates: For storage piles of aggregate provide good drainage; prevent inclusion of foreign matter; preserve gradation. Maintain sufficient live storage to permit segregation of successive shipments, concrete placement at required rate, and such procedures as heating, inspection and testing.

2.15. STRENGTH REQUIREMENTS

A. Concrete shall have a compressive strength at the end of 28 days of not less than 2500 pounds per square inch for site concrete, not less than 3500 psi for columns, walls, and slabs, and not less than indicated elsewhere on drawings and in these specifications.

2.16. CONCRETE STRENGTH, PROPORTIONS AND DESIGN

A. The structural concrete mixture shall be proportioned and designed to develop the stipulated minimum ultimate compressive strength at twenty-eight (28) days by limiting the maximum proportions of the aggregates and water to the total volume of cement incorporated therein. Cement content shall be as shown in Table 19A-A-8. Mixes shall be designed under Method A as described in T24 Section 2-1905A. Contractors may provide other mix designs under the provisions of Method B and Method C as described in T24 Section 2-1905A and as reproduced in paragraph N-3 and N-4 of this section. Non-structural concrete slabs on grade shall have minimum twenty eight (28) day strength of 3000 psi. A minimum of six (6) sacks of cement per yard may be used providing the water/cement ratio shown in the table below can be maintained in obtaining a workable mix unless otherwise specified or required on the Drawings.

B. Aggregate shall be uniformly graded to the maximum size required by the drawings, shall produce concrete developing strength not less than that required by the drawings or these specifications and shall have the volume of cement and water per sack of cement as follows:

Permissible assumptions as to

Aggregate Max. Size	Minimum sack of cement per yard of concrete	Water-Cement ratio in gals. per sack of cement maximum	min. ultimate 28 day compressive strength in lbs. per sq. inch
3/4"	5.0 Unreinforced slabs on grade	7.5	2000 Unreinforced slabs on grade
	5.7	7.5	2000
	6.5	6.75	2500
	7.1	6	3000
1-1/2"	5.3	7.5	2000
	5.8	6.75	2500
	6.6	6	3000

C. Compressive Strength: All concrete shall develop compressive strengths called for after twenty-eight (28) days of curing. Sample of concrete shall be taken from the mixes in accordance with the requirements of paragraph "C" of General Section. If any sample fails to attain this strength, the Owner shall bear the full costs for further tests of the portion of the work represented by such sample and the Contractor shall be backcharged, and should the failure still appear, the Contractor shall remove and properly replace the work at no cost to the Owner.

D. Method B Designed Mix: Concrete mixes may be based upon previously proven mixes and material tests made by a recognized testing agency. The design of such mixes shall be based on the ultimate strength of the concrete assumed in the design of the structure and shall take into consideration both the workability of the mix and the durability of the concrete. Mixes shall contain the minimum cement quantities noted on the Drawings.

E. When strengths in excess of 4,000 lb. per square inch are required, or when lightweight or special aggregates not having a record of satisfactory performance are used, or admixtures are used to reduce the cement content, Method C shall be used to determine the mix.

F. Method C: Pre-Tested Mix: When mixes other than those specified under Methods A and B or lightweight or special aggregates are used, preliminary tests of the concrete mix shall be made unless the Engineer or Architect, based upon tests and controls previously established, specifically waives this requirement. Such tests shall be made by a recognized testing laboratory. The average strength of the concrete mixes as tested in the laboratory shall provide a 25 percent higher strength than the assumed f'c except that the increased need not exceed 750 lb. per square inch.

G. Where design criteria in Section 2-1905 of T24 provide for the use of a splitting tensile strength value of concrete as a modifier, laboratory tests shall be made in accordance with UBC Standards to establish the value of fct corresponding to the specified value of f'c.

H. Tensile splitting tests of field concrete shall not be used as a basis for acceptance.

I. If the cement content is less than that specified in the Table 2-26A for Method B or Method C, the concrete batching plant must be continuously inspected by an accepted Testing Laboratory. The cost of such inspection will be paid by the Owner and back charged to the Contractor.

J. Introduction of calcium chloride will not be permitted.

K. Miscellaneous patching mortars, non-shrink grout, etc., as approved, shall be mixed in accordance with approved manufacturer's instructions.

2.17. RELATED MATERIALS

A. Granular Base: Evenly graded mixture of fine and coarse aggregates to provide, when compacted, a smooth and even surface below slabs on grade.

B. Vapor Retarder: Provide vapor retarder cover over prepared base material were indicated below slabs on grade. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

1. Polyethylene sheet not less than 10 mils thick.

C. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

D. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

1. Metallic
   a. "Vibrofoil"; A.C. Horn, Inc.
   b. "Metallic Spec. Grout"; The Burke Co.
   c. "Embeco 636"; Master Builders.
   d. "Ferrolith GDS"; Sonneborn-Rexnord.
   e. "Hi-Mod Grout"; Euclid Chemical Co.
   f. "Kemox G"; Sika Chemical Co.
   g. "Ferrogrout"; L & M Const. Chemical Co.
   h. "Supreme Plus"; Gifford-Hill/American Admixtures.
2. Non-Metallic
   a. "Set Grout"; Master Builders.
   b. "Sonogrout"; Sonneborn-Rexnord.
   c. "Euco-NS"; Euclid Chemical Co.
   d. "Supreme"; Gifford-Hill/American Admixtures.
   e. "Crystex"; L & M Const. Chemical Co.
   f. "Sure-Grip Grout"; Dayton Superior Corp.
   g. "Horngrout"; A.C. Horn, Inc.
   h. "Five Star Grout"; U.S. Grout Corp.
   i. "SikaGrout 212"; SIKA Corporation

PART 3 - EXECUTION

3.01. PREPARATION FOR PLACING CONCRETE

A. Remove water from excavations before depositing concrete. Divert any water flow through side drains; remove without washing over any freshly deposited concrete. Remove hardened concrete, debris, and foreign materials from form interiors and from mixing and conveying equipment inner surfaces.

B. Concrete shall not be placed until the forms and reinforcement have been inspected by the Structural Engineer or his authorized representative, and not until all preparations for the pour have been checked by the Inspector. This inspection is for the purpose of checking the reinforcement steel placement and form dimensions and in no way shall relieve the Contractor of his responsibility for the safety of the forms and shoring.

C. All anchors, bolts, inserts and any other hardware to be set in concrete shall be firmly set and positively held in position before concrete is placed.

D. Except in freezing weather, wet forms in sufficient time in advance of pouring to close all cracks and prevent leakage of cement or grout from mix.

E. Provide runways or other means for wheeled equipment to convey concrete to deposit points. Do not wheel equipment used to deposit concrete over reinforcement; do not support runways on reinforcement.

3.02. PIPES AND CONDUITS

A. Pipes, other than conduits for electrical circuits, shall not be embedded in structural concrete except as shown on the structural plans. When placed in slabs, conduits shall be located within the middle half of the slab. No conduit shall be place between the reinforcing steel and the bottom of the slab. No conduit placed in a concrete slab shall have an outside diameter greater than one-third of the thickness of the slab. No conduit shall be embedded in a slab that is less than 3-1/2 inches thick except for local offsets.

B. Pipes and conduits may pass through walls of floor slabs by means of sleeves so located as not to impair the strength of the structure. The Contractor shall see that adequate sleeves are provided before concrete is placed.

3.03. CLEANING FORMS AND EQUIPMENT

A. Before concrete is poured all equipment for mixing and transporting the concrete shall be cleaned, all debris, and ice shall be removed from the place to be occupied by the concrete; forms shall be thoroughly wetted (except in freezing weather), or oiled.

3.04. MIXING

A. Job Mixing:

1. The capacity of the mixer shall be such that it will handle one or more full sack batches. No split sack batches will be permitted, except when all materials are weighed. At no time shall the mixer be loaded beyond its capacity. The capacity of the mixer shall be the rated capacity as given in the manufacturer's catalog, provided that a quantity equal to the rated capacity can be thoroughly mixed in the prescribed time period, and further provided that there is no loss of ingredients during the mixing. Each batch shall be mixed not less than 1-1/2 minutes after all ingredients are in the mix and until the entire mass is uniform and homogeneous. If shall be completely discharged before the mixer is recharged.
2. The peripheral speed of concrete mixing drums shall be approximately 200 feet per minute. The mixer shall be equipped with an automatic time lock on the discharge control arranged to start the time cycle on the down strike of the material skip or on the closing of the hopper gate.

B. TRANSIT MIXED CONCRETE. Transit-mixed concrete shall conform with ASTM C-94.

1. The concrete plant must comply fully with the requirements of ASTM C94.
2. Quantities of materials used in transit-mixed concrete shall be continuously checked or measured by a batch plant inspector suitable to the Architect and Engineer. The cost of such batch plant inspection shall be paid by the Owner and deducted from the Contract amount. With the authorization of the Architect, batch plant inspection may be waived under either of the following conditions:
   a. The concrete plant complies fully with the requirements ASTM C94, Sections 8 and 9, and has a current certificate from the National Ready Mixed Concrete Association. The certification shall indicate that the plant has automatic batching and recording capabilities. The plant must be equipped with an automatic batcher in which the total batching cycle, except for the measuring and introduction of an admixture, is completed by activating a single starter device.
   b. When batch plant inspection is waived, the following requirements shall apply: The Architect or Structural Engineer in cooperation with the testing agency shall propose a method for quality control. A minimum of one set of two cylinders shall be taken and tested for each 50 cubic yards of concrete or fraction thereof. The quantities of materials shall be certified by a licensed weigh master. The quality of the materials shall be verified by the testing agency.

3. Qualitative check of the components shall be made by a qualified person designated by the Architect who shall take samples at the batch plant, when directed. Cost of such qualitative checks shall be borne by the Owner except in case faulty material is revealed by such check, in which event the next check and subsequent checks until acceptable material is restored shall be paid for by the Owner and backcharged to the Contractor.
4. Transit-mixed concrete shall be mixed for a period of not less than ten (10) minutes at a peripheral drum speed of approximately two hundred (200) feet per minute and mixing shall be continued until discharge is completed. At least three (3) minutes of the mixing period shall be at the job. Transit mixers shall be equipped with water measuring devices consisting of either accurately calibrated water tanks or water meters. Transit-Mixed concrete shall be rejected if not placed in final position within one and one-half hours (1-1/2) after water is first added to the batch or before hydration begins.
5. The inspector shall be provided the load ticket and shall identify the mix before accepting the load. He shall keep a daily record of the pour, identifying each truck, its load, the time of receipt and the location of the concrete placed.

3.05. TRANSPORTATION OF CONCRETE

A. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which shall prevent the separation of loss of the ingredients.

3.06. PLACING CONCRETE

A. Under no circumstances shall concrete that has partially hardened (hydration begun) be deposited in the work. Concrete shall be deposited in the forms as nearly as practicable in its final position to avoid flowing. It shall be so deposited as to maintain, until the completion of the unit, an approximately horizontal plastic surface. In placing concrete in walls or thin sections of considerable height, openings in forms, elephant trucks, tremies or other approved devices, shall be used that will permit the concrete to be placed in a manner that will prevent segregation and accumulation of hardened concrete on the forms or metal reinforcement above the level of the concrete. Such devices shall be so installed that concrete will be dropped vertically. Free fall of concrete shall not exceed 5 feet in height. When concrete placing is once started, it shall be carried on as a continuous operation until the section is completed between predetermined construction joints.

B. No concrete shall be placed under water except by special permission of and under the supervision of the Structural Engineer.

C. Place concrete footings upon undisturbed clean surfaces, free from frost, ice, mud or water.

D. Compaction:
   1. Place concrete in layers not over 24" deep; compact each layer by mechanical internal vibrating equipment supplemented by hand-spading, rodding, or tamping as directed. Do not use vibrators to transport concrete inside forms. Use of form vibrators is not permitted. Internal vibrators shall maintain a speed of at least 5,000 impulses per minute when submerged in concrete. Contractor shall maintain at least one spare vibrator as relief.
   2. Limit vibration duration to time necessary to produce satisfactory consolidation without causing segregation. Do not insert vibrator into lower courses that have begun to set. Apply vibrator at uniformly spaced points not farther apart than visible effectiveness of machine.

E. Bonding and Grouting: Before depositing new concrete on or against concrete that has set, thoroughly roughen and clean existing surfaces of laitance, foreign matter and loose particles. Retighten forms; slush existing surfaces with neat cement grout coat. Place new concrete before grout has attained initial set. Give horizontal construction joints a grout brush coat of cement and fine aggregate in same proportion as concrete to be placed followed by about 3 inches of concrete of regular mix except reduce proportion of coarse aggregate 50%.

F. Record of Placement: A record shall be kept at the job site of the time and date of placing the concrete in each portion of the structure. Such record shall be open to the inspection of the Structural Engineer.

G. Cold Weather Placement: Unless otherwise approved, mix concrete and place only when temperature is at least 40^{o}F. For placing at lower temperatures, when permission to pour is

obtained, heat material; otherwise prepare so that batching and mixing can proceed as specified. Provide means for maintaining concrete at a minimum of 50ºF for 72 hours after placing. Obtain approval for methods proposed for heating materials and protecting concrete. Do not mix salts, chemical, or other materials with concrete to prevent freezing nor use accelerating agents except when necessary to pour concrete in existing or probable ambient of 25º to 49ºF; then approved accelerators may be introduced into the concrete if approved by the Architect. Calcium chloride is not permitted.

3.07. CONSTRUCTION AND EXPANSION JOINTS

A. Construction Joints:

1. Typical details and proposed locations of construction joints are indicated on the plans. Joints not indicated on the plans shall be so made and located, with the permission of Structural Engineer, as to least impair the strength of the structure and shall conform to the typical details. The surface of all construction joints shall be cleaned and roughened by removing the entire surface and exposing clean aggregate, solidly embedded in mortar matrix, in accordance with the following procedure.
2. The contract surface must be thoroughly cleaned by chipping or sand blasting the entire surface not earlier than five (5) days after initial pour or by an approved method that will assure equal bond such as a thorough hose washing of the surface not less than two (2) or more than four (4) hours after the concrete is placed (depending on setting time), all wash water and deleterious material shall be entirely cleaned from the surface and water clearly drained from surface.
3. In the event that the contact surface becomes coated with earth, sawdust, etc., after being cleaned, the entire surface so coated shall be re-cleaned by sandblasting or other effective means.
4. Unit of operation shall be not over 60'-0" in any horizontal direction. Place concrete continuously to produce monolithic unit. Permit 48 hours to elapse between casting of adjoining units. Construction joints shall not be placed in work unless favorably reviewed by the Structural Engineer. Locate construction joints, where required, near mid-point of spans for slabs, beams, or girders, unless beam intersects girder at center, in which case offset joints in girder distance equal to twice beam width; make provision for shear with inclined reinforcement. Make joints in columns or piers at underside of deepest beam or girder framing thereto. Pour columns, piers or walls of ordinary height at least two hours before any overhead work is placed thereon.
5. Place girders, beams, and slabs in one operation. In walls having door or window openings; terminate lifts of individual pours at opening top or bottom. Terminate other lifts per structural requirements or as directed. Make provisions for jointing successive pours as specified under Bonding, Grouting (paragraph F 5).

B. Expansion Joints:

1. Construct expansion joints as indicated and approved. Do not run reinforcement, corner protection angles, or other fixed metal items, embedded in or bonded into concrete continuously through expansion joint unless specifically detailed.
2. Joints between slabs on earth, where indicated, shall be premolded expansion joint filler strips, 1/2 inch thick, depth as indicated on drawings and specified herein.
3. Finish concrete slab edges along expansion joints neatly with slightly rounded edging tool.

3.08. CONCRETE SLABS ON GRADE

A. When all reinforcing and pipes are properly supported, floor drains, outlet boxes and other items finishing flush with the surface of the slab are placed to correct levels and all screeds are set, the Contractor shall notify the Architect that the work is ready for inspection. Upon completion of the inspection and the approval of the Architect, the pouring may then commence. The extent of the area to be poured shall be contingent upon the number of cement finishers available to properly finish the slab pour contemplated.

B. All interior floor slabs on grade shall be constructed on fill per the geotechnical report. See Drawings for specific aggregate base requirements at specific locations. Over the sub-grade compacted fill (and/or base) install min. 2" granular fill followed by a vapor barrier and min. 2" clean sand. The under-floor vapor barrier shall be installed by Carpentry & General Work

Contractor. To minimize the possibility of damage to the vapor barrier the Contractor shall place electrical conduits in the bed of min. 2" of sand immediately above vapor seal. The Contractor shall inform Structural Engineer and Architect 48 hours before the first pour of concrete.

C. Concrete shall be deposited in the forms between screeds as rapidly as possible, using runways set over the slab to prevent disturbing the surface of the sub-base, reinforcing, or embedded items. Forms shall be poured full before moving on to other areas.

D. Screeding shall follow immediately thereafter by working the concrete surface by vibration of the screed and tamping as screed moves along. All low spots to be filled in and the surface back screeded to a finish plane.

E. All concrete slabs shall be tamped with approved grid tamper of size not less than 12 square inches so as to depress the large aggregates only an amount which will allow finishing, then shall be rodded to uniform surfaces of required levels.

F. The surface shall then be push floated with a hard push float to being up the fines and moisture for finishing.

G. Surface Tolerance: Surface of slab shall be true to plane within 1/8" in 10 feet as determined by a 10 foot long straightedge placed anywhere on the slab in any direction.

H. Pitch slab as required where floor drains occur.

3.09. PROTECTION AND CURING

A. General:

1. Immediately after placing and finishing, protect concrete surfaces from loss of moisture for at least seven (7) days. Execute protection from loss of surface water by any one of the following methods, where applicable to type of work involved:
   a. By water covering or continuous spray.
   b. By covering of surfaces with water impervious paper.
   c. By membrane cure.
2. Do not use membrane curing on surfaces required to receive additional concrete or concrete fill, nor on cement finish coats that are to receive dust proofing, hardening treatments, or other surface treatments, except as such are determined to be compatible by the Architect.
3. Execute water curing by keeping concrete surface continuously wet by ponding, by continuous spraying or by covering surface with approved water saturated covering such as 1" of sand or sawdust or by one or more burlap layers. Saturate concrete exposed surfaces with water throughout stipulated curing period where forms remain in place during curing period, keep them sufficiently wetted with clean water to reduce cracks and to prevent joints in forms from opening. During damp periods, maintain water curing routine, except use only amount of water to keep forms or covering moist.

B. Floor Surfaces and Stairs:

1. Within 24 hours after final troweling, moisten finished cement floor surfaces (both wearing and non-wearing), cement finished stair treads, risers, platforms and landings; keep moist for 14 days with kraft paper covering, laid in widest practical widths; laps 3" wide; seal continuously with waterproof cement. Leave covering as protection until plastering and other rough work over these slabs has been completed. Where chemical hardener is required, do not apply it until floor has dried after curing period completion.
2. Prevent use of floors which are given cement finish surfaces for at least 5 days following completion of troweling; thereafter only light use will be permitted for additional 10 day period. Use precaution in placing concentrated loads on slabs until concrete has reached its ultimate strength.

3.10. PATCHING AND DEFECTIVE CONCRETE

A. Immediately after form work is stripped, patch minor defective and honey-combed areas; fill holes before concrete is thoroughly dry. Chip areas away to 1" depth with edges regular, perpendicular to surface. Thoroughly wet areas to be patched including areas at least 6" wide entirely surrounding area just prior to placing patching mortar.

B. Prepare mortar of same material and proportions as used for concrete except remove coarse aggregate; substitute sufficient quantity of white cement for part of gray cement so that patching mortar when dry will match surrounding concrete.

C. Prepare a grout of equal parts of Portland cement and sand with sufficient water to produce a brushing consistency and brush well into the surface, following immediately with the patching mortar.

D. Keep water in mortar mix to a minimum. Retemper mortar without adding water; allow it to stand for one hour prior to use during which time it shall be mixed to prevent setting. Compact mortar thoroughly into place; screed to leave patch slightly higher than surrounding surfaces; leave it undisturbed for one to two hours to permit initial shrinkage; finish to match adjoining work.

E. Where patches exceed 1" deep; trim and wet as specified after which fill opening to within 1" of surface. After sufficient shrinkage time has elapsed proceed with patching as described. Keep patches wet for five days.

F. Fill the holes left by withdrawal of rods or holes left by removal of ends of ties solidly with mortar unless indicated otherwise on the drawings. For holes passing entirely through wall, use plunger type grease gun or other device to force mortar through wall starting at back face. Hold cloth over hole on outside; when hole is filled completely, strike off excess mortar with cloth flush with surface. Full holes not passing entirely through wall with tool that will permit filling hole solidly with mortar. Strike off, with cloth, any excess mortar at wall surface.

G. In general, minor defective work may be repaired by use of cement mortar, as specified above, with permission of the Architect, but if the defects are serious or affect the strength of the structure, or if patching does not satisfactorily restore the quality and appearance of the surface, cement Gun Concrete shall be used. The cost of all such work shall be paid for the Owner and deducted from the contract price.

H. EVALUATION AND ACCEPTANCE OF CONCRETE STRENGTH

1. Evaluation of test results:
   a. Test results for standard molded and standard cured test cylinders shall be evaluated separately for each specified concrete mix design.
   b. For evaluation of potential strength and uniformity, each specified mix design shall be represented by at least five tests.
2. Acceptance of Concrete: The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three consecutive strength tests results equal or exceed the specified strength f'c, and no individual strength test result falls below the specified strength f'c.
3. Investigation of Low-Strength Test Results: If the strength of the molded test cylinders falls below the minimum ultimate compressive strength assumed in the design, the proportions of the concrete mix for the remaining portion of the structure shall be adjusted so as to give concrete of the assumed minimum strength. The doubtful concrete in place shall be tested by taking cores as outline below.
   a. Cores shall be taken at representative places throughout the structure as designated by the Engineer.
   b. Cores at least 4 in. in diameter shall be obtained and tested in accordance with ASTM C42. If the concrete in the structure will be dry under service conditions, the cores shall be air dried (temperature 60 to 80 F. relative humidity less than 60 percent), for 7 days before test and shall be tested dry. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be tested after moisture conditioning in accordance with ASTM C42.
   c. The cores shall be tested as required for cylinders.
   d. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. If, before testing, one or more of the core shows evidence of having been damaged subsequent to or during removal from the structure, it shall be replaced.
   e. Concrete in an area represented by core tests shall be considered adequate if the average of three cores is equal to at least 85 percent of the required compressive

strength and no single core is less than 75 percent of the required compressive strength. Final acceptance is subject to Architect's favorable review.

f. Core holes shall be coated with an epoxy resin binder and packed with epoxy mortar as described in Paragraph 3-13. Repair shall not be visible in finished work. Final acceptance is subject to Architect's favorable review.

4. The method of repair of defective concrete where the strength of the structure is affected shall be determined by the Structural Engineer and the OSHPD.

3.11. FINISHES

A. Refer to finish schedule and details or notes on drawings.

3.12. CONCRETE SLAB FINISHES

A. Steel trowel finish; Exposed interior finish shall be accomplished with three steel troweling operations, the first and second trowelings to be performed when the concrete has hardened sufficiently to support the finishers on knee boards. The third troweling shall follow the setting of the concrete and the surface shall be burnished to a true, hard, polished finish. Interior finish to receive covering shall be accomplished with two steel troweling operations as specified.

B. Wood Float Finish: Tamp concrete with special tools to force aggregate away from surface; screed with straight edge to being surface to required line, as indicated while concrete is still green, but hardened sufficiently to bear finisher's weight, float surface with wood float to true, uniform, plane with no coarse aggregate visible. Dusting to absorb surface water is not permitted.

C. Smooth Integral Cement Finish: Finish coat shall be at least 1" thick, apply after screeding while concrete is still green, after surface water has disappeared (not over 45 minutes after placing base course). Mix shall be one part Portland cement, one part fine aggregate and 2 parts coarse aggregate. Fine aggregate shall pass 1/4" mesh sieve, not over 5% pass 100 mesh sieve, not over 10% pass 50 mesh sieve. Grade coarse aggregate from 1/8" to 3/8" mesh, not over 10% passing sieve. Water shall not exceed 5 gallon per cement sack. Screed finish to true even surface; float and trowel smooth. Do not float or trowel surface while finish coat is wet or sloppy. After having set sufficiently to ring under rowel, give work second troweling, burnishing.

D. Chemical Hardener, Dustproofing Application: Apply hardener to concrete floors noted on the Room Finish Schedule. Cure floors thoroughly; clean; dry perfectly with all work above them completed. Apply hardener as per manufacturers' directions; apply at least two (2) coats; allow at least 24 hours between coats. Use one gallon of hardener to cover not over 100 sq. ft. After final coat is completed and begins to dry flush the surface thoroughly with clean water, using a stiff bristle floor broom to remove excess white crystal deposit.

E. Cleaning: When kraft paper covering is removed from floors, clean surface thoroughly; use approved grade linseed oil soap. When cleaned and dried protect surfaces again for painting and other work. Should there remain any deep stains, effloresence or encrustations of mortar on floors which washing does not remove, remove these with wire brush or steel wool and clean water.

3.13. FINISHES FOR SURFACES OTHER THAN CONCRETE SLABS

A. Exposed Concrete to be Painted, Smooth Finish: Smooth off joint marks; remove blemishes; leave finished surfaces smooth and unmarred. Fins and offsets shall be ground off. Grinding shall be accomplished as soon as possible after removal of forms.

B. Cleaning: No cleaning operations shall be undertaken until the walls of the building are entirely completed. Cleaning portions of the walls as the work progresses will not be permitted.

C. If, in the opinion of the Architect, the surface of the concrete shows a film or oil left from an excess of oil on the forms, or the concrete is oil-stained or otherwise not uniform, he may require the use of the following cleaning method for which the Contractor shall make allowance in his proposal:

1. Mix 1 part Portland Cement and 1-1/2 parts fine sand with sufficient water to produce a grout having the consistency of thick paint. Wet the surface of the concrete sufficiently to prevent absorption of water from the grout and apply the grout with brushes or spray gun uniformly, completely filling air bubbles and holes. Immediately after applying the grout, float the surface with a cork or other suitable float, scouring the wall vigorously. While the grout is still plastic, the surface shall be finished with a sponge rubber float removing all excess grout.

This finishing shall be done at the time when grout will not be pulled from holes or depressions. Next allow the surface to dry thoroughly, and then rub it vigorously with dry burlap to completely remove any dried grout.

2. There shall be no visible film of grout remaining after this rubbing. The entire cleaning operation for any area must be completed the day it is started. No grout shall be left on the wall overnight. After the entire building has been grout-cleaned, any slightly dark spots or streaks that remain shall be wiped off lightly with a fine abrasive hone without using water, but the rubbing with the hone shall not be sufficient to change the texture of the concrete. This final operation shall be included as a part of the grout cleaning.

3.14. CLEANING UP

A. All debris and/or rubbish resulting from the operations of this trade shall be cleaned up and removed from the site as the work progresses.

PART 4 - FIELD QUALITY CONTROL

4.01. GENERAL:

A. Concrete materials and operations will be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the Engineer for final acceptance.

B. Inspection and testing shall be performed in accordance with requirements of Title 24, Part 2, CBC.

C. The Engineer and the Division of the State Engineer shall have the right to order the testing of any materials used in concrete construction to determine if they are of the quality specified.

4.02. TESTING AND INSPECTION

A. General: The required inspection services shall be performed by the project inspector. The necessary testing services shall be performed by a testing agency acceptable to the Architect.

B. Inspection Requirements: The project inspector shall be at the site during the placing of any concrete and perform the following duties:

1. Review plans and specifications and meet with the Contractor to discuss requirements before
2. Review and/or check-test the contractor's proposed materials for compliance with the drawings and specifications.
3. Determine that all tests of materials have been made and all results are in hand.
4. Keep records of all tests and inspections.
5. Observe forms and placement of reinforcing steel, embedded items, and joints.
6. Inspect the construction and removal of forms, false-work and shoring.
7. Inspect the conveying, placement, consolidation, finishing, curing, protection, repair, and patching of the concrete.
8. Review the contractor's plan for stripping and form removal.
9. Record any significant construction loads on completed floors, members, or walls.
10. A record shall be kept on the work of the time and date of placing concrete in each portion of the structure. Such record shall be kept until the completion of the structure and shall be open to the inspection of the Division of the State Engineer.
11. Obtain licensed weigh master’s certificates for all concrete deliveries to verify quantities of materials.

C. The required testing services shall be performed by the inspection agency designated.

1. All testing and inspection agencies shall meet the requirements of ASTM E 329.
2. Preconstruction Testing:
   a. Sample and test aggregates for compliance. Secure production samples of materials at plants, stock- piles, and at the point of placement during the course of the work and test for compliance with the specifications.

3. Review and/or check-test the contractor's proposed materials for compliance with the drawings and specifications.
   a. Obtain the manufacturer's certificate of conformance and affidavit for cement. If not available, secure and test samples of cement. One sample of cement shall be taken for each 100 tons of cement, except that when used in bulk loading ready-mix plants where separate bins for pretested cement are not available, grab samples shall be taken for each shipment of cement placed in the bin, with not less than one sample being taken for each day's pour and such samples shall be subsequently tested.
   b. Review proposed mix designs and provide opinion as to suitability.
   c. Provide records of all tests and inspections.
   d. Batch Plant Inspection: The quality and quantity of materials used in transit mixed concrete and batched aggregates shall be continuously inspected at the location where materials are measured by a specially approved inspector.
4. Conduct strength tests of the concrete during construction in accordance with the following procedures:
   a. Secure composite samples in accordance with ASTM C172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.
   b. Mold and cure three specimens from each sample in accordance with ASTM C31. Any deviations from the requirements of this Standard shall be recorded in the test report.
   c. Test specimens in accordance with ASTM C39. Two specimens shall be tested at 28 days for acceptance and one shall be tested at 7 days for information. The acceptance test results shall be the average of the strengths of the two specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the remaining cylinder shall be considered the test result. Should both specimens in a test show any of the above defects, the entire test shall be discarded. When high early strength concrete is used, the specimens shall be tested at the ages indicated in the contract documents.
   d. Make at least one strength test (a set of 3 cylinders) for each 50 cubic yards of structural concrete for each grade of concrete used and there shall be at least one test for each day's placement for each grade of concrete used. Provide at least one strength test for each 2000 square feet of surface area for slabs or walls.
   e. On a given project, if the total volume of concrete is such that the frequency of testing above would provide less than five strength tests (a set of 3 cylinders) for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.
5. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C 143.
6. Determine air content of normal weight concrete sample for each strength test in accordance with either ASTM C231 or ASTM C 173.
7. Determine temperature of concrete sample for each strength test.
8. Determine air temperature at placement time. When the ambient temperature falls below 40°F or rises above 95°F, a complete record shall be kept of concrete temperatures and of protection given to concrete during placement and curing.
9. Inspect concrete batching, mixing and delivery operations.
10. Provide additional testing and inspection required because of changes in materials or proportions requested by the contractor.
11. Provide additional testing of materials or concrete occasioned by their failure by test or inspection to meet specification requirements.

4.03. REPORTS:

A. Project Inspector:
   1. Report all work as Verified Reports per Title 24, Part 2, CBC.
   2. Notify Architect of any materials or work not conforming to project specifications.

B. Testing Agency:

1. Provide reports of all test results or inspection services promptly to Project Inspector, Contractor, Architect, and Engineer. All test reports shall include the exact location in the work at which the batch represented by a test was deposited. Reports of strength tests shall include detailed information on storage and curing of specimens prior to testing.
2. Notify Project Inspector, Contractor, and Engineer of the failure of any materials to comply with project specifications.

4.04. RESPONSIBILITIES AND DUTIES OF CONTRACTOR:

A. The contractor shall submit to the Engineer the concrete materials data and the concrete mix designs proposed for use.

B. The contractor is solely responsible for the direction and supervision of the entire construction operation, the providing of satisfactory materials and labor, safety of working conditions, and the ultimate quality of the structure.

1. The Contractor shall provide and maintain an adequate program of quality control for materials, production methods, and workmanship to assure conformance of all work to the project documents.
2. To facilitate testing and inspection, the contractor shall:
   a. Furnish any necessary labor to assist the designated testing agency in obtaining and handling samples at the project or other sources of materials.
   b. Advise the designated testing agency sufficiently in advance of operations to allow for completion of quality tests and for the assignment of personnel.
   c. Provide and maintain for the sole use of the testing agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hr. as required by ASTM C31.

END OF SECTION

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SECTION 03 5416
HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Hydraulic cement underlayments and surface preparation.

1.02. RELATED SECTIONS

A. Section 03 3000 - Cast-in-Place Concrete

1.03. REFERENCES

A. ASTM International (ASTM):

1. ASTM C 109/C 109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
2. ASTM C 150/C 150M - Standard Specification for Portland Cement.
3. ASTM C 219 - Standard Terminology Relating to Hydraulic Cement.
4. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
5. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.04. SUBMITTALS

A. Submit under provisions of Section 01 3000 - Administrative Requirements.

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. Installation methods.

1.05. QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.

1.06. PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.07. DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.08. PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.09. SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Acceptable Manufacturer: MAPEI Americas, which is located at : 1144 E. Newport Center Rd.; Deerfield Beach, FL 33442; Toll Free Tel: 800-42-MAPEI; Tel: 954-246-8888; Fax: 954-246-8801; Email: request info (techservicerequests@mapei.com/US-EN); Web: www.mapei.com/US-EN

B. Acceptable Manufacturer: MAPEI Americas, which is located at : 2900 Francis-Hughes Laval, PQ, Canada H7L 3J5; Tel: 450-662-1212; Fax: 450-662-0444; Email: request info (techservicerequests@mapei.com/CA-EN); Web: www.mapei.com/CA-EN

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.02. HYDRAULIC CEMENT UNDERLAYMENTS

A. High-Performance, Quick-Setting, Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied from feather edge to 1-1/2 inches (38 mm).

1. Product: Subject to compliance with requirements, provide MAPEI Corporation; Ultraplan 1 Plus.

B. Performance Requirements:

1. Cement Binder: ASTM C 150/C 150M, Portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
2. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

C. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

D. Water: Potable and at a temperature of not more than 70 degree F (21 degree C).

E. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

F. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

1. Water-Based Epoxy Primer:
   a. Product: Subject to compliance with requirements, provide MAPEI Corporation: Primer WE.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of the Work.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.02. PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions.

1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
2. Fill substrate voids to prevent underlayment from leaking.

B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.

1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 5 lbs of water/1000 sq. ft. (2,27 kg of water/100 sq. m) in 24 hours.

2. Seal with Mapei Planiseal VS Moisture Barrier.

C. Metal Substrates: Mechanically remove, according to manufacturer's written instructions, rust, foreign matter, and other contaminants that might impair underlayment bond. Apply corrosion-resistant coating compatible with underlayment if recommended in writing by underlayment manufacturer.

D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.03. APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
2. Coordinate application of components to provide optimum adhesion to substrate and between coats.
3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to product surface.
2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Apply surface sealer at rate recommended by manufacturer.

G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.04. PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

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SECTION 05 1000
STRUCTURAL STEEL

PART 1 - GENERAL

1.01. RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02. SCOPE:

A. The work required under this section consists of all structural steel work and related items necessary and required to complete the work as indicated in the Contract Documents. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.

1.03. DESCRIPTION OF WORK

A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.

B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.

C. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. Promptly remove and replace materials or fabricated components which do not comply.

D. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated or potential interferences may exist. Perform no work until issue is resolved.

1.04. RELATED WORK SPECIFIED ELSEWHERE

A. Miscellaneous Metal Fabrications (Division 5)

B. Metal Deck (Division 5)

C. Concrete (Division 3)

D. Masonry (Division 4)

1.05. SUBMITTALS

A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
2. High-strength bolts (each type), including nuts and washers and welded studs.
3. Structural steel primer paint.
4. Shrinkage-resistant grout.

B. Shop Drawings: Submit shop drawings prepared under supervision of a registered professional engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams. Submit two (2) copies of shop drawings on bond paper; one copy will be returned with comments. Contractor shall make sufficient copies of the returned set for distribution to all parties.

1. Prior to performing detailing, review all conditions for interferences and ability of fabricator and erector to achieve proper fit. Notify Architect of any such conditions and request clarification instructions.
2. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols, and show size, length, and type of each weld.
3. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

C. Shop drawings shall be submitted to the Structural Engineer for review as per the General Conditions. No fabrication shall be commenced before receiving the Structural Engineer's review of Shop Drawings. When the Structural Engineer has reviewed the shop drawings the Contractor shall make distribution to interested parties, including one copy for the Building Inspector.
1. Indicate necessary information for fabrication, erection and painting of structural steel work as per AISC Specifications.

D. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

E. Surveys: Submit certified copies of each survey conducted by a registered professional engineer, showing elevations and locations of base plates and anchor bolts to receive structural steel, and final elevations and locations for major members. Indicate discrepancies between actual installation and contract documents.

1.06. QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated or specified:
1. AISC "Code of Standard Practice for Steel Buildings and Bridges".
2. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence: "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings".
3. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.
4. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use
7. Title 24, Part 2, California Building Code, 2013 Edition

B. Welding of any connections or members which resist, carry, collect, or distribute seismic forces shall meet the recommendations of the AWS STRUCTURAL WELDING COMMITTEE POSITION STATEMENT ON NORTHRIDGE EARTHQUAKE WELDING ISSUES, dated Nov. 10, 1995. This requirement specifically includes a requirement for V-Notch toughness of welding rod/wire deposits and applies to shop and field welding. Members and connections are typically braced frame members and connections, columns of braced frames, and floor and roof beams in line with braced frames (may extend across full dimension of structure). Power source for welding shall be of constant voltage type when recommended by the electrode manufacturer.

C. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".
1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
   a. Welders shall be certified for each electrode type as required.
   b. If recertification of welders is required, retesting will be Contractor's responsibility.

1.07. TESTING AND INSPECTION

A. Steel shall not be fabricated, delivered to site, nor used until it has been tested, and has been approved by the Architect, the Structural Engineer, or the representative of the Testing Laboratory selected by the Architect or the Structural Engineer to make the tests.

B. Reports certifying that materials and workmanship conform with the Contract Drawings and Specifications shall be submitted by testing laboratory as per General Conditions.

C. If the steel can be identified by heat or melt numbers and is accompanied by mill analyses and test reports, commercial stock may be used subject to the approval of the Structural Engineer, provided one tension and one bend test is made for each heat or fractional apart thereof of each size of such commercial stock.

D. When the material cannot be identified or its source is questionable and it is anticipated that there is likely to be undue variation of results, one set of physical tests shall be made for each five tons or fractional part thereof of each size. Additional tests shall be made when deemed necessary.

E. Costs of tests shall be borne by the owner as per the General Conditions.

F. Test specimens shall be taken and marked under the direction of the Architect, the Structural Engineer or the representative of the Testing Laboratory selected by the Architect or Structural Engineer to make the tests. Specimens shall be machined to dimensions called for by the "Standard Specifications for Structural Steel for Bridges and Buildings", A.S.T.M. Designation A36. The expense of taking and machining test specimens shall be borne by the Contractor.

G. Complete four-sided inspection of all steel shall be made when required by the Architect or Structural Engineer.

H. When ordered by the Structural Engineer, inspection of shop and field fabrication shall be made by a properly qualified person or testing laboratory who shall submit to the Structural Engineer reports certifying that the material and workmanship conform to the approved plans and specifications.

1.08. DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01. MATERIALS

A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes. All materials shall be new.

B. Steel: Material shall be made by either open-hearth or electric-furnace process only and shall conform to the Standard Specifications for Structural Steel for Bridges and Buildings, A.S.T.M. Designation A-36.

1. Structural Steel Channels, Angles and Plates: ASTM A 36.
2. Structural Steel Wide Flanges & WT Sections: ASTM A 992.
3. Hollow Structural Section (HSS) Square & Rectangular Tubes: ASTM A 500 GR. B.
4. Hollow Structural Section (HSS) Round Tubes: ASTM A 500 GR. B.

5. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.
6. Finish: Black, except where indicated to be galvanized.
7. Steel Castings: ASTM A 27, Grade 65-35, medium-strength carbon steel.
8. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 or 1020, cold finished carbon steel; with dimensions complying with AISC Specifications.
9. Anchor Bolts: ASTM A 307, machine bolt type unless otherwise indicated.
10. Anchor Rods: ASTM F1554 GR. A.
11. Unfinished Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers. Provide hexagonal heads and nuts for all connections.
12. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
13. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.
14. Electrodes for Welding: Comply with American Welding Society "Iron Steel Arc Welding Electrodes" ASW-E-70 series rods.
15. Structural Steel Primer Paint: SSPC - Paint 13.
16. Cement Grout: Portland cement ASTM C 150, Type II and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.
17. Metallic Shrinkage-Resistant Grout: Pre-mixed factory-packaged ferrous aggregate grouting compound.
18. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
    a. Firmix; Euclid Chemical Co.
    b. Embeco 153; Master Builders.
    c. Ferrolith G; Sonneborn/Contech.
    d. Irontox; Toch Brothers.
    e. Kemox C; Sika Chemical.
    f. Vibra-Foil; W. R. Grace.
19. Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CE-CRD-C621.
20. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
    a. Euco N.S.; Euclid Chemical Co.
    b. Crystex; L&M Construction Chemicals.
    c. Masterflow 713; Master Builders.
    d. Five Star Grout; U.S. Grout Corp.
    e. Upcon; Upco Chem. Div., USM Corp.
    f. Propak; Protex Industries, Inc.
    g. Set Non-Shrink; Set Products, Inc.
    h. SikaGrout 212; Sika Corporation

2.02. FABRICATION

A. Fabrication and erection shall comply with the latest edition of "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction, and the following requirements:

1. Store, handle, erect and support all material at all times with great care to ensure that no piece is bent, twisted, or otherwise injured.
2. Defects or damages of any kind occurring in material shall be corrected before erection; if such defects cannot be corrected in the field, he material shall be returned to the shop or new parts furnished as directed at no additional cost to the Owner.

3. Mill bearing surfaces to true planes. Fit abutting surfaces closely. Bring assembled parts into close contact.
4. Connections not shown shall conform to the current AISC Standards.

B. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

C. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

D. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

E. Connections: Weld or bolt shop connections, as indicated.

F. Bolt field connections, except where welded connections or other connections are indicated.
1. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
2. Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts, and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.

G. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ).

H. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Coordinate work to ensure inspection of all welding.

I. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

J. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Shop weld shear connectors, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

K. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.

L. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

M. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03. SHOP PAINTING

A. General: Have paint delivered to shop and job in original sealed containers, marked with manufacturer's name and brand identification. Use paint as prepared by manufacturer without thinning or other admixtures. Execute painting on dry surfaces, free from rust, scale, and grease; do no painting in temperature lower than 45^{o}F.

B. Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" embedded areas only.
1. Do not paint surfaces which are to be welded or high-strength bolted with friction-type connections.
2. Do not paint surfaces which are scheduled to receive sprayed- on fireproofing.
3. Apply 2 coats of paint to surface which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

C. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) with any of the following:

1. SP-1 "Solvent Cleaning".
2. SP-2 "Hand Tool Cleaning".
3. SP-3 "Power Tool Cleaning".
4. SP-5 "White Metal Blast Cleaning".
5. SP-6 "Commercial Blast Cleaning".
6. SP-7 "Brush-Off Blast Cleaning".
7. SP-10 "Near-White Blast Cleaning".

D. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.

E. Field Painting: Spot paint bolts, field welds, and serious abrasions to shop paint with paint as used for shop coat; field paint as follows:

1. Exterior wall steel and steel not visible in completed structure -- one coat of approved Zinc-Chromate, Alkyd type.
2. Steel visible in completed structure and steel exposed to elements - two coats of approved Zinc-Chromate, Alkyd type.

PART 3 - EXECUTION

3.01. ERECTION

A. Erection includes setting of columns, bases, and erection of structural steel as required by this section. Set column bases on leveling nuts to level and to accurate elevations. Wooden wedges are not permitted. Grout per manufacturer's recommendations. Do not correct field errors by burning. Plumbing or leveling steel at elevator shafts, allowed variations shall be 1:1000 from plumb. Other steel shall be level or plumb within tolerance of 1:500. Give special attention to steel handling during construction to avoid overloading green floors slabs; adhere to Architect and/or Structural Engineer instructions when criticisms are made in this regard.

B. Surveys: Employ a registered professional engineer or land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

1. Measurements: The Contractor shall verify and be responsible for the correctness, conformity, accuracy, and execution of his work to conform to any existing conditions and details of the buildings.

C. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

1. The structural frames shall be carried up true and plumb, and temporary bracing shall be introduced wherever necessary to take care of all loads to which the structures may be subject, including erection equipment and the operation of same. Temporary bracing shall be left in place as long as may be required for safety.

D. Temporary Planking: Provide temporary planking, working platforms, and railings as necessary to effectively and safely complete work.

E. Construction Loads: Wherever piles of materials, erection equipment or other loads are carried by the frame during its erection, proper provisions shall be made to limit the stresses resulting from such construction loads.

F. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on leveling nuts or other adjusting devices.
2. Tighten anchor bolts after supported members have been positioned and plumbed.
3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
4. For proprietary grout materials, comply with manufacturer's instructions.

G. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

H. Level and plumb individual members of structure within specified AISC tolerances and as may be specified on the Drawings.

1. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service. Splice members only where indicated and accepted on shop drawings.

I. Erection Bolting: As the erection progresses, the work shall be securely bolted up to take care of the stresses resulting from such construction loads.

1. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

J. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

K. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts. Poor matching of holes shall be cause for rejection.

L. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting may be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted. All cuts are to be cut by a mechanically guided torch. The radius of re-entrant flame cut fillets shall be as large as possible, but never less than one inch. To determine the net area of members, so cut, one eighth inch shall be deduced from the flame cut edges. Gas cutting shall comply with Section 22.202(e) of the UBC Standards.

M. Gas cuts shall be smooth and regular in contour.

N. Holes for bolts shall not be cut with a torch. Gas cutting or other holes in a member which has not been designed therefor shall not be permitted.

O. Final Bolting: No final bolting shall be done until the structure has been properly aligned. Final bolting shall be done with machine bolts or High Strength bolts where designated. All machine bolts shall have a cut washer under nut and nut shall be locked by burring thread of bolt.

P. Facing: All compression joints which depend upon contact bearing shall have all bearing surfaces truly faced after the component parts of the members are permanently attached. Rolled steel bearing plates less than four (4) inches in thickness may be used without planning the top surface provided that a satisfactory contact bearing is obtained.

Q. Punching: When the thickness of the metal is equal to or less than the diameter of the unfinished bolts plus one-eighth (1/8) inch, it may be punched one-sixteenth (1/16) inch larger than the nominal diameter of the unfinished bolt. When the metal is thicker than the diameter of the unfinished bolt plus one-eighth (1/8) inch, the holes shall be drilled, or sub-punched and reamed. Holes for unfinished bolts shall be one-sixteenth (1/16) inch larger than the nominal diameter of the bolt. The die for all sub-punched holes and the drill for all sub-drilled holes, shall be one-sixteenth (1/16) inch smaller than the nominal diameter of the bolt.

R. Electrical Arc Welded Studs: Where shown on the drawings, wood fastening to structural steel shall be accomplished by the use of the Nelson Arc Stud Welder as manufactured by the Nelson Sales Corporation, Orain, Ohio. Studs for fastening two inch (nominal) thick lumber shall be 1/2" diameter, 2-1/4" long. Studs for fastening three inch (nominal) thick lumber shall be 1/2"

diameter, 3-1/4" long. Use of electric Arc Welded studs shall be in strict accordance with the manufacturers' recommendation.

S. Heating: Rolled sections, except for minor details shall not be heated.

T. Annealing: Steel casting, where used, shall be properly annealed.

U. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.02. BOLTS

A. Except as otherwise noted, all other bolts shall be machine bolts. Nuts shall be hex nuts or an approved self locking type or the bolt threads shall be upset to prevent the backing off of the nuts. Provide washers under all nuts so that threads are not in the shear plane. High strength bolts and assembly of same shall comply with the "Specifications of Assembly of Structural Joints Using High-Tensile Steel Bolts," approved by Research Council on Rivet and Bolted Structural Joints of the Engineering Foundation, September, 1966. Contract surfaces shall not be painted and shall be cleaned.

3.03. WELDING

A. Welding shall comply with the requirements of T24, Part 2, Section 2-22 and UBC Standards No. 22-6.

B. Execute welding in shop and field by operators who are duly qualified and certified to make uniform, reliable butt and filler welds in flat, vertical and overhead positions.

C. Manual welds for light gage steel construction (under three-sixteenth of an inch in thickness) shall be made only by operators who have been previously qualified by tests acceptable to the Structural Engineer.

D. All welding shall be done by an electric arc clean-welding process using shield arc. Welding rod shall be uniformly and heavily coated (not washed), of such nature that coating will not chip or peel while being used, with maximum amperage specified by manufacturer and in general rods to be E70 Series rods as manufactured by Lincoln Electric Company, or equal, not greater than 1/4 inches in diameter. Welding machines shall be direct current arc welding machine as approved. Generator shall be provided with suitable devices to regulate speed, to manually adjust current output and to automatically maintain constant current and arc voltage at every setting of manual control with amperage capacity sufficient to overcome line drop and to give adequate welding heat. Arc lengths shall be as short as the operator can hold and in no case exceed the diameter of the electrode.

E. The Lincoln Electric inner shield welding process may be used for both shop and field welds. The welding shall be done with the Lincoln LN-4 Squirtwelder with Lincoln SAF-600 D.C. Generator, Reverse Polarity, using Lincoln NS-3M-.120" wire electrodes. The welds shall be placed in accordance with the Lincoln Electric Specifications. The welding operators shall be experienced and pre-qualified with this process by making test specimens which when tested meet the strength and bending requirements of A-36 Structural Steel.

1. Comply with requirements of Section 1.5.2 where applicable.

F. Surfaces to be welded shall be well-cleaned by wire brushing, chipping, or hammering, of loose scale, etc.

G. In assembling and during welding, the component parts shall be held together by sufficient clamps or other adequate means to keep parts straight and in close contact.

H. Maximum space between pieces to be butt welded shall not exceed 1/4 inch and maximum space between members to be fillet welded shall not exceed 1/16 inch.

I. Butt welds shall be complete-penetration butt welds as specified in the D1.1-Rev.2-77 edition of the AMERICAN WELDING SOCIETY.

J. Welds greater than 1/4 inch shall be made with two passes and welds greater than 3/8 inch shall be made with three or more passes, with welds cleaned each time electrode is changed and before application of additional beads.

K. All burned or flame-cut edges shall be chipped clean before welding and then welded.

L. After depositing, welds shall be brushed with wire brushes and shall show uniform section, smoothness of weld metal, edges free from undercuts or overlaps, freedom from porosity and clinkers, and visual inspection at edges and ends of fillets and butt joints to indicate good fusion with, and penetration into, base metals. Defective welds or parts of welds shall be cut out and replaced.

M. Weld "Run-off" plates shall be used on heavy butt welds of 1/2" or greater thickness. Remove run-off plates where recommended by current recommendations for welding of seismic joints.

3.04. QUALITY CONTROL

A. The Owner's Testing and Inspection agency will inspect high-strength bolted connections and welded connections and perform tests and prepare test reports.

B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

C. Contractor shall coordinate and provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.

E. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Additional tests will be performed, at Contractor's expense, as may be necessary to reconfirm any non- compliance or original work, and as may be necessary to show compliance of corrected work.

F. Shop Bolted Connections: Inspect or test in accordance with AISC specifications.

G. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
   1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   2. Perform visual inspection of all welds.
   3. Perform tests of welds as follows, using procedure most appropriate to conditions being verified. Laboratory shall use one or more of the following procedures for verification of full penetration welds, and may use one or more of the following procedures for verification of other welds:
      a. Liquid Penetrant Inspection: ASTM E 165.
      b. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
      c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
      d. Ultrasonic Inspection: ASTM E 164.

H. Field Bolted Connections: Inspect in accordance with AISC specifications.

I. Field Welding: Inspect and test during erection of structural steel as follows:
   1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   2. Perform visual inspection of all welds.
   3. Perform tests of welds as follows, using procedure most appropriate to conditions being verified. Laboratory shall use one or more of the following procedures for verification of full penetration welds, and may use one or more of the following procedures for verification of other welds:
      a. Liquid Penetrant Inspection: ASTM E 165.
      b. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
      c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
      d. Ultrasonic Inspection: ASTM E 164.

3.05. CLEANING UP

A. All debris and/or rubbish resulting from the operations of this trade shall be cleaned up and removed from the site as the work progresses.

END OF SECTION

SECTION 05 4000
COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.01. DOCUMENT PRIORITY

A. The intent of this section is to supplement the structural drawings in areas not covered by those drawings. Where there is a conflict between this section and the structural drawings ('S' sheets), the drawings shall control. Bring all discovered conflicts to the attention of the Architect, immediately. Where the statement "unless otherwise noted (indicated)" appears on the structural drawings, it shall mean "unless otherwise noted (indicated) on the structural drawings" and does not refer to this section.

1.02. SECTION INCLUDES

A. Load bearing formed steel stud exterior wall framing.

1.03. REFERENCES

A. ASTM A 123/A 123M -Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 1997a.

B. ASTM A 653/A 653M -Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 1999a.

C. ASTM C 955 -Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2000.

D. AWS 01.1 -Structural Welding Code -Steel; American Welding Society; 2000.

E. SSPC-Paint 20 -Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 1991 (Part of Steel Structures Painting Manual, Vol. Two).

1.04. SUBMITTALS

A. See Section 01 3000 -Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

C. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

1.05. QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

B. Installer: Company specializing in performing the work of this section with minimum three years of documented experience.

PART 2 - PRODUCTS

2.01. FRAMING MATERIALS

A. Studs and Track: ASTM C 955; studs formed to channel shape with punched web; U-shaped track in matching nominal width and compatible height.

1. Gage and depth: As indicated on the drawings.
2. Galvanized in accordance with ASTM A *653/A* 653M *G90/Z275* coating.

2.02. ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.

C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I -Inorganic.

2.03. FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: ASTM A 123/A 123M, hot dip galvanized to 1.3 oz/sq ft.

B. Anchorage Devices: Power actuated.

C. Welding: In conformance with AWS D1.1.

PART 3 - EXECUTION

3.01. INSTALLATION OF STUDS

A. Install components in accordance with manufacturer's instructions.

B. Construct comers using minimum of three studs. Install double studs at wall openings, door and window jambs.

C. Install studs full length in one piece. Splicing of studs is not permitted.

D. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

E. Install intermediate studs above and below openings to align with wall stud spacing.

F. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

G. Install framing between studs for attachment of mechanical and electrical items, and to. prevent stud rotation.

H. Touch-up field welds and damaged galvanized surfaces with primer.

END OF SECTION

SECTION 05 7313
DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.01. SCOPE:

A. Pre-engineered glass and stainless steel railing systems and related items necessary to complete the work indicated on the drawings and/or described in he specifications. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all materials, equipment, and incidentals necessary and required for their completion.

B. All drawings, general and supplementary conditions including division one specifications apply to this section.

1.02. DESCRIPTION OF WORK

A. Extent of metal decking is indicated on drawings, including basic layout and type of deck units required.

1.03. RELATED WORK SPECIFIED ELSEWHERE

A. Structural Steel (Division 5)

B. Miscellaneous Metal Fabrications (Division 5)

C. Concrete (Division 3)

D. Reinforcing (Division 3)

E. Insulating concrete (Division 7)

1.04. SUMMARY

A. Section Includes:

1. Glass- and plastic-supported railings.

B. Related Requirements:

1. Section 06 1053 "Miscellaneous Rough Carpentry" for wood blocking for anchoring railings.
2. Section 09 2216 "Non-Structural Metal Framing" for metal backing for anchoring railings.

1.05. DEFINITIONS

A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

1.06. COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.07. PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.08. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal. Ensure compliance with requirements included in Section 01 3300 "Submittal Procedures."

B. Product Data: For the following:

1. Manufacturer's product lines of railings assembled from standard components.
2. Grout, anchoring cement, and paint products.

C. Shop Drawings: Include plans, elevations, sections, and attachment details.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.09. QUALITY ASSURANCE

A. Provide the following upon request:
1. Qualification Data: For professional engineer.
2. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
4. Preconstruction test reports.
5. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.10. FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

B. All measurements for handrails and railings should be taken from construction site elements to which railings are to fasten. This information to be recorded on final shop drawings.

C. Coordinate fabrication schedule with construction progress to avoid delay of work

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. HDI Railing Systems, Inc
2. Julius Blum & Co., Inc.
3. C. R. Laurence Co., Inc.
4. Livers Bronze Co.

B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods, including structural analysis, preconstruction testing, field testing, and in-service performance.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

2.02. PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design railings, including attachment to building construction.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
1. Steel: 72 percent of minimum yield strength.
2. Glass: 25 percent of mean modulus of rupture (50 percent probability of breakage), as listed in "Mechanical Properties" in AAMA's Aluminum Curtain Wall Series No. 12, "Structural Properties of Glass."

C. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lbf/ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   2. Infill of Guards:
      a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
      b. Infill load and other loads need not be assumed to act concurrently.
   3. Glass-Supported Railings: Support each section of top rail by a minimum of three glass panels or by other means so top rail will remain in place if any one panel fails.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.03. METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

C. All internal members shall be stainless steel, nylon or wood to eliminate the possibility of rust.

2.04. STAINLESS STEEL

A. Tubing: ASTM A 554, Grade MT 304.

B. Pipe: ASTM A 312/A 312M, Grade TP 304.

C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.

D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666 or ASTM A 240/A 240M, Type 304.

E. Bars and Shapes: ASTM A 276, Type 304.

2.05. STEEL AND IRON

A. Tubing: ASTM A 500/A 500M (cold formed) or ASTM A 513.

B. Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.

2.06. GLASS AND GLAZING MATERIALS

A. Safety Glazing: Glazing shall comply with 16 CFR 1201, Category II.

B. Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type 1 (transparent flat glass), Quality-Q3. Provide products that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to 16 CFR 1201 for Category II materials.
   1. Glass Color: Clear.
   2. Thickness: As indicated on Drawings.

2.07. FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:
   1. Dissimilar Metals: Type 304 stainless-steel fasteners.

B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.

1. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.08. MISCELLANEOUS MATERIALS

A. Low-Emitting Paints and Coatings: Paints and coatings applied to interior decorative metal railings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.09. FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

H. Form changes in direction as follows:

1. As detailed.

I. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

J. Close exposed ends of hollow railing members with prefabricated end fittings.

K. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.

L. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.10. GLAZING PANEL FABRICATION

A. General: Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.
   1. Clean-cut or flat-grind edges at butt-glazed sealant joints to produce square edges with slight chamfers at junctions of edges and faces.
   2. Grind smooth exposed edges, including those at open joints, to produce square edges with slight chamfers at junctions of edges and faces.

B. Infill Panels: Provide tempered glass panels for both straight and curved sections.

2.11. GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.12. STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. Run grain of directional finishes with long dimension of each piece.

C. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.01. INSTALLATION, GENERAL

A. Installation shall be performed by an agent qualified or authorized by the manufacturer.

B. Fit exposed connections together to form tight, hairline joints.

C. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
   3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

E. Adjust railings before anchoring to ensure matching alignment at abutting joints.

F. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.02. RAILING CONNECTIONS

A. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.03. ANCHORING POSTS

A. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For aluminum railings, attach posts as indicated using fittings designed and engineered for this purpose.
2. For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.

3.04. INSTALLING GLASS PANELS

A. Post-Supported Glass Railings: Install assembly to comply with railing manufacturer's written instructions and with requirements in other Part 3 articles. Erect posts and other metal railing components, then set factory-cut glass panels. Do not cut, drill, or alter glass panels in field. Protect edges from damage.

3.05. FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports. Payment for these services will be made by Owner.

B. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings according to ASTM E 894 and ASTM E 935 for compliance with performance requirements.

C. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.

D. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.06. CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with water and soap, rinsing with clean water, and wiping dry.

B. Clean copper alloys according to metal finisher's written instructions in a manner that leaves an undamaged and uniform finish matching approved Sample.

C. Clean and polish glass as recommended in writing by manufacturer. Wash both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion.

D. Clean wood rails by wiping with a damp cloth and then wiping dry.

3.07. PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 06 4100
CUSTOM CABINETS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Special fabricated cabinet units.

B. Countertops.

C. Cabinet hardware.

1.02. REFERENCES

A. BHMA A156.9 -American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 1994 (ANSIIBHMA A156.9).

B. FS A-A-1936 -Adhesive, Contact, Neoprene Rubber; Federal Specifications and Standards; 1996.

C. The North American Architectural Woodwork Standards (NAAWS), latest edition.

1.03. SUBMITTALS

A. See Section 01 3000 -Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

C. Product Data: Provide data for hardware accessories.

1.04. QUALITY ASSURANCE

A. Perform work in accordance with NAAWS, Premium quality.

1.05. DELIVERY, STORAGE, AND PROTECTION

A. Protect units from moisture damage.

1.06. ENVIRONMENTAL REQUIREMENTS

A. During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

1.07. WARRANTY

A. Provide warranty as required by Section 01 7800 -CLOSEOUT SUBMITTALS

B. Work shall be free of defects, including but not necessarily limited to, delamination, door or drawer warpage exceeding NAAWS standards for a period of two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01. PLASTIC LAMINATED CASEWORK

A. Construction: Style A face frameless, Flush Overlay, Type I

B. Exposed surfaces, unless otherwise indicated, shall be high pressure laminate of the following grades. Color to be as selected by Architect from manufacturer's standard palette.

1. Horizontal Surfaces: GP-50 (0.050" nominal thickness).
2. Post Formed Surfaces: PF-42 (0.042" nominal thickness).
3. Vertical Surfaces: GP-28 (0.028" nominal thickness).
4. Fabricate exposed edges of casework, including edges of doors and drawers when open, with matching plastic laminate, except as otherwise indicated.

C. Semi-Exposed Surfaces:

1. Definition: Per referenced standards except at open casework and behind glass, both of which shall be considered exposed.
2. Semi-exposed surfaces shall be, unless otherwise indicated, low pressure polyester laminate. Semi-exposed surfaces of case, door and drawer panels which have high pressure laminate on opposite face shall be finished with .020" backing material. Semi-exposed edges shall be 3mm PVC, glued in place.

2.02. PLASTIC LAMINATE COUNTERTOPS

A. General: Except as otherwise indicated, all plastic laminate countertops whether installed on cabinet work specified herein or on other casework or other support systems indicated shall comply with requirements for plastic laminate casework.

2.03. LAMINATE MATERIALS

A. Manufacturers:
   1. Formica Corp.
   2. WilsonArt International, Inc
   3. Substitutions: See Section 01 6000 -Product Requirements.

2.04. ACCESSORIES

A. Adhesive: Use adhesives that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.".

B. Fasteners: Size and type to suit application.

C. Grommets: Plastic material for cut-outs.

2.05. CABINET HARDWARE AND ACCESSORY MATERIALS:

A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for units which are specified as "door hardware" in other sections of these specifications.

B. Finish: 626 unless otherwise indicated.

C. Cabinet Door Hardware:
   1. Hinges: Concealed, adjustable, self-closing.
   2. Pulls: Wire, 3-1/2"

D. Drawer Hardware:
   1. Slides:
      a. Pencil Drawer: Accuride #2006 series.
      b. Box Drawer up to 8" Deep: Accuride #2037 series.
      c. Box Drawer 8" and Deeper and File Drawer: Accuride #3832 series.
   2. Pulls: Wire, 3-1/2.

E. Locks: Where indicated, provide standard pin-type or disc-type (5 pins or discs) tumbler locks, keyed individually except as otherwise indicated.
   1. Door and Single Drawer: National #8051-55.
   2. Gang: National #D8090.

F. Shelf Supports: Where shelving is indicated as "adjustable", provide slotted-type recessed standards and brackets of type needed to support shelves with uniform 40 lb. per sq. ft. loading.

G. Miscellaneous Hardware: Provide other hardware as indicated or otherwise required for a complete and functional installation.

2.06. FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Cap exposed plastic laminate finish edges with material of same finish and pattern.

C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit comers and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

E. Provide cutouts for incorporated items. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verify 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. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims.

B. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

C. The use of sealants shall be kept to a minimum and when used shall conform to the requirements of JOINT SEALANTS section.

D. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation except where prefinished matching fastener heads are required.

E. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

F. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of casework with transparent finish.

G. Countertops: Anchor securely to base units and other support systems as indicated.

3.03. FINISHED WORK:

A. Cabinetwork shall be true to lines and levels and free of surface defects, such as hammer marks, gouges, cracks, etc., and be ready for the work of finish section.

B. Cabinetwork shall conform to the tolerance requirements of the referenced standards.

C. Door and drawer faces shall be aligned vertically and horizontally and shall be flush to each other.

D. Door and Drawer pulls shall be aligned with door and drawer edges and with each other.

E. Other areas shall be free of debris and damage from work of this section.

END OF SECTION

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SECTION 06 6000
PLASTIC FABRICATIONS

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02. SUMMARY

A. Section Includes:
   1. Solid surface material countertops.
   2. Solid surface material backsplashes.
   3. Solid surface material end splashes.

1.03. SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.
   1. Countertop material, 6 inches square.
   2. Wood trim, 8 inches long.

D. Closeout Submittals
   1. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.04. QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

C. Provide the following upon request:
   1. Qualification Data: For fabricator

1.05. FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete

1.06. COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.01. SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
      a. E. I. du Pont de Nemours and Company.
      b. Formica Corporation.
      c. LG Chemical, Ltd.
      d. Samsung Chemical USA, Inc.

e. Wilsonart International Holdings, Inc.

2. Type: Provide Standard type unless Special Purpose type is indicated.
3. Integral Sink Bowls: Comply with CSA B45.5/IAPMO Z124.
4. Colors and Patterns: As selected by Architect from manufacturer's full range.

B. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

C. Particleboard: ANSI A208.1, Grade M-2.

D. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.02. COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Custom.

B. Configuration:

1. Front: Straight, slightly eased at top.
2. Backsplash: Straight, slightly eased at corner.
3. End Splash: Matching backsplash.

C. Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.

D. Backsplashes: 1/2-inch- thick, solid surface material.

E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.
2. Install integral sink bowls in countertops in the shop.

F. Joints: Fabricate countertops without joints.

G. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
   a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
   b. Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch into fixture opening.
   c. Provide 3/4-inch full bullnose edges projecting 3/8 inch into fixture opening.
2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.03. INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Sealant for Countertops: Comply with applicable requirements in Section 07 9000 "Joint Sealants."

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

I. Apply sealant to gaps at walls; comply with Section 07 9000 "Joint Sealants."

END OF SECTION

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SECTION 07 2100
BATT INSULATION

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Batt insulation in wall and ceiling construction.

1.02. REFERENCES

A. ASTM C 665 -Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; latest release.

B. ASTM E 84 -Standard Test Method for Surface Burning Characteristics of Building Materials; latest release.

1.03. SUBMITTALS

A. See Section 01 3000 -Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation, and installation techniques.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04. ENVIRONMENTAL REQUIREMENTS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 - PRODUCTS

2.01. BATT INSULATION MATERIALS

A. Batt Insulation: ASTM C 665; preformed glass fiber batt; friction fit, conforming to the following:

1. Thermal Resistance: As indicated on drawings
2. Facing: Unfaced.
3. Surface Burning Characteristics: Flame spread/Smoke developed index of *25/450,* when tested in accordance with ASTM E 84 ..
4. Manufacturers:
   a. a. CertainTeed Corp.
   b. b. Johns Manville.
   c. c. Owens Coming Corp.
5. Substitutions: See Section 01 6000 -Product Requirements.

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 and adhesive.

3.02. BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions for the specific conditions.

B. Install in wall 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. Secure insulation batts within wall spaces to eliminate sagging prior and subsequent to concealment.

F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

3.03. PROTECTION OF FINISHED WORK

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 4 - GENERAL

4.01. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

4.02. SUMMARY

A. Section Includes:
   1. Formed roof-drainage sheet metal fabrications.
   2. Formed low-slope roof sheet metal fabrications.
   3. Formed wall sheet metal fabrications.

B. Related Requirements:
   1. Section 06 1053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Section 07 9513.13 "Interior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for interior floors, walls, and ceilings.
   3. Section 07 9513.16 "Exterior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for exterior building walls, soffits, and parapets.

4.03. COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

4.04. PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.
   1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
   3. Review requirements for insurance and certificates if applicable.
   4. Review sheet metal flashing observation and repair procedures after flashing installation.

4.05. ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.
   1. Include plans, elevations, sections, and attachment details.
   2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
   3. Include identification of material, thickness, weight, and finish for each item and location in Project.
   4. Include details for forming, including profiles, shapes, seams, and dimensions.
   5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
   6. Include details of termination points and assemblies.
   7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
   8. Include details of roof-penetration flashing.

9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

4.06. CLOSEOUT SUBMITTA S

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

4.07. QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
   1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

B. Provide the following upon request:
   1. Qualification Data: For fabricator.
   2. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.
   3. Product Test Reports: For each product, for tests performed by a qualified testing agency.

4.08. DELIVERY, STORAGE, AND HANDELING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

4.09. WARRENTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 5 - PRODUCTS

5.01. PERFORMANCE REQUIRMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

D. FM Approvals Listing: Manufacture and install copings roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with name of fabricator and design approved by FM Approvals.

E. SPRI Wind Design Standard: Manufacture and install [copings] [roof edge flashings] tested according to SPRI ES-1 and capable of resisting the following design pressure:
   1. Design Pressure: As indicated on Drawings.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

5.02. SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

5.03. UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
   1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
   2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.

B. Slip Sheet: Rosin-sized building paper, 3 lb./100 sq. ft. minimum.

5.04. MESCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal [or manufactured item] unless otherwise indicated.

B. Solder:
   1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, non-staining tape 1/2 inch wide and 1/8 inch thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric [polyurethane] [polysulfide] [silicone] polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

5.05. FABRICATION GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
   1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
   2. Obtain field measurements for accurate fit before shop fabrication.
   3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
   4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

I. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

J. Do not use graphite pencils to mark metal surfaces.

5.06. LOW-SLOPE ROOF SHEET METAL FABRICATION

A. Cap Flashing/Counterflashing Fabrication - General: Provide two-piece metal cap flashings, consisting of an upper receiver portion and a lower portion extending over the composition flashing, unless otherwise specified or indicated.

1. Cap Flashing/Counterflashing Fabrication - Two Piece
   a. Fabricate the receiver portion with outer edge formed into a double fold turned down one inch, unless otherwise indicated, and as follows:
      1) At walls faced with metal siding or pre-formed metal panels, extend the receiver portion into the wall as indicated, and terminated with edge folded over support.
      2) At parapet, extend the receiver portion over wood blocking as indicated.
      3) At parapet, extend the receiver portion as indicated and form the upper edge to engage the double fold of coping
   b. Form the upper edge of the lower portion of metal cap flashing to engage in the double fold of receiver portion, bent to provide spring action against the base flashing, fold the lower edge folded back 1/2 inch and lap composition base flashing not less than 4 inches.
   c. Lap ends of each length of both portions of metal cap flashing not less than 3 inches. Weld or solder corner joints. Return ends at roof edge into reglet or wall.

5.07. WALL SHEET METAL FABRICATION

A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Fabricate from the following materials:

1. Galvanized Steel: 0.022 inch thick.

PART 6 - EXECUTION

6.01. EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

6.02. UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

6.03. INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners [solder], protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of [uncoated-aluminum] [and] [stainless-steel] sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant.

When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Section 07 9200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work

6.04. ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

D. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

E. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate the roof.

6.05. WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

6.06. ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

6.07. CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

SECTION 07 7200
ROOF ACCESSORIES

PART 7 - GENERAL

7.01. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

7.02. SUMMARY

A. Section Includes:
   1. Roof curbs.
   2. Equipment supports.

7.03. COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

7.04. ACTION SUBMITALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3300 "Submittal Procedures."

B. Product Data: For each type of roof accessory.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Shop Drawings: For roof accessories.
   1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

D. Delegated-Design Submittal: For roof curbs equipment supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
   2. Wind-Restraint Details: Detail fabrication and attachment of wind restraints. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

7.05. INFORMATIONAL SUBMITALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
   1. Size and location of roof accessories specified in this Section.
   2. Method of attaching roof accessories to roof or building structure.
   3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
   4. Required clearances.

B. Sample Warranties: For manufacturer's special warranties.

7.06. CLOSEOUT SUBMITALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

7.07. WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 8 - PRODUCTS

8.01. PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design [roof curbs] [and] [equipment supports] to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind-Restraint Performance: As indicated on Drawings.

8.02. ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints,[straight sides,] [integral metal cant,] [stepped integral metal cant raised the thickness of roof insulation,] and integrally formed deck-mounting flange at perimeter bottom.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

C. Material: Zinc-coated (galvanized) steel sheet, 24 gage min. thick.

D. Construction:
   1. Curb Profile: [Manufacturer's standard] [Profile as indicated on Drawings] compatible with roofing system.
   2. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
   3. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.
   4. Top Surface: Level top of curb, with roof slope accommodated by sloping deck-mounting flange.
   5. Insulation: Factory insulated with 1-1/2-inch- thick glass-fiber board insulation.
   6. Liner: Same material as curb, of manufacturer's standard thickness and finish.
   7. Nailer: Factory-installed wood nailer [along top flange of curb] [under top flange on side of curb], continuous around curb perimeter.
   8. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb, of size and spacing required to meet wind uplift requirements.
   9. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch-thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
   10. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as curb.

8.03. EQUIPMENT SUPPORTS

A. Equipment Supports: [Internally reinforced perimeter] [Rail-type] metal equipment supports capable of supporting superimposed live and dead loads between structural supports, including equipment loads and other construction indicated on Drawings, spanning between structural supports; capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, integral metal can't, and integrally formed structure-mounting flange at bottom.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

C. Material: Zinc-coated (galvanized) steel sheet, 0.079 inch thick.

D. Construction:

1. Curb Profile: Manufacturer's standard compatible with roofing system.
2. Insulation: Factory insulated with 1-1/2-inch- thick glass-fiber board insulation.
3. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
4. Nailer: Factory-installed continuous wood nailers 3-1/2 incheswide on top flange of equipment supports or under top flange on side of curb, continuous around support perimeter.
5. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb of size and spacing required to meet wind uplift requirements.
6. Platform Cap: Where portion of equipment support is not covered by equipment, provide weathertight platform cap formed from 3/4-inch thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
7. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
8. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
9. Fabricate equipment supports to minimum height of 12 inches above roofing surface unless otherwise indicated.

8.04. METAL MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation [and mill phosphatized for field painting where indicated].

1. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.

8.05. MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches thick.

C. Underlayment:

1. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

2. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated.
3. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.

D. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

E. Elastomeric Sealant: ASTM C 920, elastomeric [polyurethane] [silicone] polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

8.06. GENERAL FINISH REQUIRMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 9 - EXECUTION

9.01. EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

9.02. INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.
1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C. Roof Curb Installation: Install each roof curb so top surface is level.
1. Attach curbs to wood nailer on roof deck with wood screws.
2. Weld curbs to metal roof deck.

9.03. REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 9113 "Exterior Painting."

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Clean off excess sealants.

E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

SECTION 07 8400
FIRESTOPING

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

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

1.02. SUMMARY

A. This Section includes firestopping for the following:

B. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

C. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

D. Sealant joints in fire-resistance-rated construction.

E. Related Sections: The following Sections contain requirements that relate to this Section:

F. Section 07 2100 "Batt Insulation" for safing insulation and accessories.

G. Section 07 900 "Joint Sealants" for non-fire-resistive-rated joint sealants.

1.03. SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

B. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

C. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:

1. Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.

D. Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

F. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

G. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

H. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

I. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

1.04. SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.

C. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

D. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.

E. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.

F. Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.

G. Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

H. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.05. QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:

B. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.

C. Through-penetration firestop systems are identical to those tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:

D. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.

E. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by UL in their "Fire Resistance Directory," by Warnock Hersey, or by another approved qualified testing and inspecting agency.

F. Fire-resistive joint sealant systems are identical to those tested for fire-response characteristics per ASTM E 119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water, as measured 0.78 inch from the face exposed to furnace fire. Provide systems complying with the following requirements:

G. Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified testing and inspecting agency.

H. Joint sealants, including backing materials, bear classification marking of qualified testing and inspection agency.

I. Information on drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.

J. Installer Qualifications: Engage an experienced Installer who has completed firestopping that is similar in material, design, and extent to that indicated for Project and that has performed successfully.

K. Single-Source Responsibility: Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.

L. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

M. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

1.06. DELIVERY, STORAGE, AND HANDLING

A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.07. PROJECT CONDITIONS

A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

1.08. SEQUENCING AND SCHEDULING

A. Do not cover up those firestopping installations that will become concealed behind other construction until authorities having jurisdiction, if required, have examined each installation.

PART 2 - PRODUCTS

2.01. FIRESTOPPING, GENERAL

A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

B. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

1. Permanent forming/damming/backing materials including the following:
2. Semirefractory fiber (mineral wool) insulation.
3. Joint fillers for joint sealants.
4. Temporary forming materials.
5. Substrate primers.
6. Collars.

C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

D. FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

1. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.
2. Intumescent, Latex Sealant: Single-component, intumescent, latex formulation.
3. Intumescent Putty: Nonhardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
4. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum foil on one side.

E. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

F. Endothermic, Latex Sealant:
   1. Fyre-Shield, Tremco Inc.
   2. Endothermic, Latex Compounds:
   3. Flame-Safe FS500/600 Series, International Protective Coatings Corp.
   4. Flame-Safe FS900/FST900 Series, International Protective Coatings Corp.

G. Intumescent Latex Sealant:
   1. Metacaulk 950, The RectorSeal Corporation.
   2. Fire Barrier CP 25WB Caulk, 3M Fire Protection Products.

H. Intumescent Putty:
   1. Pensil 500 Intumescent Putty, General Electric Co.
   2. Flame-Safe FSP1000 Putty, International Protective Coatings Corp.
   3. Fire Barrier Moldable Putty, 3M Fire Protection Products.

I. Intumescent Wrap Strips:
   1. Dow Corning Fire Stop Intumescent Wrap Strip 2002, Dow Corning Corp.
   2. CS2420 Intumescent Wrap, Hilti Construction Chemicals, Inc.
   3. Fire Barrier FS-195 Wrap/Strip, 3M Fire Protection Products.

J. Job-Mixed Vinyl Compound:
   1. USG Firecode Compound, United States Gypsum Co.

2.02. MIXING

A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02. PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:

B. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

C. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.

D. Remove laitance and form release agents from concrete.

E. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

F. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping

materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.03. INSTALLING THROUGH-PENETRATION FIRESTOPS

A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

D. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.

E. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

F. or fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04. INSTALLING FIRE-RESISTIVE JOINT SEALANTS

A. General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.

C. 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 width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

D. Tool non-sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.05. FIELD QUALITY CONTROL

A. Inspecting agency will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.

B. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

C. Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

3.06. CLEANING

A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestopping complying with specified requirements.

END OF SECTION

SECTION 07 9000
JOINT SEALANTS

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

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

1.02. SUMMARY

A. This Section includes joint sealants for the following locations:
   1. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
      a. Control and expansion joints in cast-in-place concrete.
      b. Control and expansion joints in unit masonry.
      c. Joints between different materials listed above.
      d. Perimeter joints between materials listed above and frames of doors and windows.
      e. Control and expansion joints in ceiling and overhead surfaces.
      f. Other joints as indicated.
   2. Exterior joints in horizontal traffic surfaces as indicated below:
      a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
      b. Joints between different materials listed above.
      c. Other joints as indicated.
   3. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints of exterior openings where indicated.
      c. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
      d. Perimeter joints between interior wall surfaces and frames of interior doors, windows.
      e. Perimeter joints of toilet fixtures.
      f. Other joints as indicated.
   4. Interior joints in horizontal traffic surfaces as indicated below:
      a. Control and expansion joints in cast-in-place concrete slabs.
      b. Other joints as indicated.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 7 Section "Exterior Insulation and Finish Systems - Class PB" for sealing system joints.
   2. Division 7 Section "Flashing and Sheet Metal" for sealing joints related to flashing and sheet metal for roofing.
   3. Division 8 "Glass and Glazing" for sealants used in glazing.
   4. Division 9 Section "Gypsum Drywall" for sealing concealed perimeter joints of gypsum board partitions to reduce sound transmission.
   5. Division 9 Section "Tile" for sealing tile joints.

1.03. SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

1.04. SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data from manufacturers for each joint sealant product required.

C. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

D. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.

1.05. QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

1.06. DELIVERY, STORAGE, AND HANDLING

A. 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.

B. 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.

1.07. PROJECT 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.

PART 2 - PRODUCTS

2.01. MATERIALS, GENERAL

A. 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.

B. Colors: Provide color of exposed joint sealants to comply with the following:

1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

2.02. ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated, including those requirements referenced for Type, Grade, Class, and Uses.

B. Multi-part Non-sag Urethane Sealant for use NT: Type M, Grade NS, Class 25, and complying with the following requirements for uses:

1. Uses: NT, M, G, A and, as applicable to joint substrates indicated, O.

C. One-part Non-sag Urethane Sealant for use NT: Type S, Grade NS, Class 25, and complying with the following requirements for uses:

1. Uses: NT, M, A and, as applicable to joint substrates indicated, O.

D. One-part Non-sag Urethane Sealant for use T: Type S, Grade NS, Class 25, and complying with the following requirements for uses:

1. Uses: NT, M, A and, as applicable to joint substrates indicated, O.

E. One-part Pourable Urethane Sealant for use T: Type S, Grade P, Class 25, and complying with the following requirements for uses:
   1. Uses: NT, M, A and, as applicable to joint substrates indicated, O.

F. Available Products: Subject to compliance with requirements, elastomeric sealants which may be incorporated in the Work include, but are not limited to, the following:
   1. Multi-Part Nonsag Urethane Sealant for Use NT:
      a. "Dynatrol II"; Pecora Corp.
      b. "Sonolastic NP 2"; Sonneborn Building Products Div., Rexnord Chemical Products Inc.
      c. "Dymeric"; Tremco, Inc.
   2. One-Part Nonsag Urethane Sealant for Use NT:
      a. "Vulkem 116"; Tremco, Inc.
      b. “Cymonic”; Tremco, Inc.
      c. "Dynatrol I"; Pecora Corp.
      d. "Sonolastic NP 1"; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.
   3. One-Part Nonsag Urethane Sealant for Use T:
      a. "Vulkem 45"; Tremco, Inc.
      b. "NR-201 Urexpan"; Pecora Corp.
      c. "Sonolastic SL - 1; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.
   4. One-Part Pourable Urethane Sealant for Use T:
      a. "Vulkem 245"; Tremco, Inc.
      b. "NR-201 Urexpan"; Pecora Corp.
      c. "Sonolastic - 1; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.

2.03. SOLVENT-RELEASE-CURING JOINT SEALANTS:

A. Butyl Sealant: Manufacturer's standard one part, nonsag, solvent-release-curing, polymerized butyl sealant complying with FS TT S-001657 for Type I and formulated with minimum of 75 percent solids to be nonstaining, paintable, and have a tack-free time of 24 hours or less.

B. Available Products: Subject to compliance with requirements, solvent-release-curing joint sealants which may be incorporated in the Work include, but are not limited to, the following:
   1. Butyl Sealant:
      a. "Chem-Calk 300"; Bostik Construction Products Div.
      b. "BC-158"; Pecora Corp.
      c. "PTI 757"; Protective Treatments Inc.
      d. "Tremco Butyl Sealant"; Tremco Inc.

2.04. LATEX JOINT SEALANTS:

A. Acrylic-Emulsion Sealant: Manufacturer's standard, one part, nonsag, mildew-resistant, acrylic-emulsion sealant complying with ASTM C 834, formulated to be painted and recommended for exposed applications on interior and on protected exterior locations involving joint movement of not more than plus or minus 5 percent.

B. Silicone Emulsion Sealant: Manufacturer's standard one part, nonsag, mildew-resistant, silicone-emulsion sealant complying with ASTM C 834 and ASTM C 920, formulated to be paintable and recommended for exposed applications on interior and on protected exterior locations involving joint movement of not more than plus or minus 12-1/2 percent.

C. Available Products: Subject to compliance with requirements, latex joint sealants which may be incorporated in the Work include, but are not limited to, the following:
   1. Acrylic-Emulsion Sealant:
      a. "AC-20"; Pecora Corp.
      b. "Sonolac"; Sonneborn Building Products Div.; Rexnord Chem. Prod., Inc.
      c. "Tremco Acrylic Latex 834"; Tremco Inc.

2. Silicone-Emulsion Sealant:
   a. "Performance Plus Silicone Sealant"; Dow Corning Corp.

2.05. ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834 and the following requirements:
   1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90.
   2. Product has flame spread and smoke developed ratings of less than 25 per ASTM E 84.

B. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
   1. Available Products: Subject to compliance with requirements, acoustical joint sealants that may be incorporated in the Work include, but are not limited to, the following:
      a. Acoustical Sealant:
         1) "SHEETROCK Acoustical Sealant," United States Gypsum Co.
         2) "AC-20 FTR Acoustical and Insulation Sealant," Pecora Corp.
         3) "Tremco Acrylic Latex 834"; Tremco Inc.
      b. Acoustical Sealant for Concealed Joints:
         1) "BA-98," Pecora Corp.
         2) "Tremco Acoustical Sealant," Tremco, Inc.
         3) "Tremco Acrylic Latex 834"; Tremco Inc.

2.06. JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Pre-formed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
   1. Either open-cell polyethylene foam or closed-cell polyethylene foam, subject to approval of sealant manufacturer.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.07. MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

D. Joint fillers for Concrete Paving: Provide joint fillers of thickness and widths indicated.
   1. Bituminous Fiber Joint Filler: Preformed strips of composition noted below, complying with ASTM D1751:
      a. Asphalt saturated fiberboard.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.02. PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other non-porous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03. INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   a. Do not leave gaps between ends of joint fillers.
   b. Do not stretch, twist, puncture, or tear joint fillers.
   c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

E. Installation of Sealants: 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.

F. Tooling of Nonsag Sealants: 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.

1. Provide concave joint configuration per Figure 6A in ASTM C 962, unless otherwise indicated.
2. Use masking tape to protect adjacent surfaces of recessed tooled joints.

G. Provide recessed joint configuration, per Figure 6C in ASTM C 962, of recess depth and at locations indicated.

3.04. CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05. PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 08 1100
STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01. RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02. DESCRIPTION OF WORK:

A. Extent of standard steel doors and frames is indicated and scheduled on drawings.

B. Finish hardware is specified elsewhere in Division 8.

1.03. QUALITY ASSURANCE:

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

B. Templates: Secure templates from finish hardware supplier for specified hardware and mounting locations.

C. Fire door assemblies shall be installed in accordance with the provisions of CBC Section 716 and NFPA 80 (CBC 716.5)

1.04. SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.

B. Shop Drawings: Submit a door schedule keyed to the opening identification symbols shown on the drawings. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, extent of hardware reinforcements and type and location of frame anchors of each opening, and fire rating locations.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

C. Samples: Full range of color samples for Architect selection; 2 samples, 6" square min., of each color and texture selected for factory-finished doors and frames.

1.05. DELIVERY, STORAGE AND HANDLING:

A. Deliver hollow metal work cartooned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.

B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01. ACCEPTABLE MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering steel doors and frames which may be incorporated in the work include; but are not limited to, the following:

B. Steel Doors and Frames:

1. Ceco Corp.
2. Curries Mfg., Inc.
3. Steelcraft/Div. American Standard Co.

4. Republic Builders Products Corp./Subs. Republic Steel.

2.02. MATERIALS:

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 366.

C. Supports and Anchors: Fabricate of not less than 18-gage galvanized sheet steel.

D. Inserts, Bolts and Fasteners: Manufacturer's standard units, complying with ASTM A 153, Class C or D as applicable.

E. Shop Applied Paint:

F. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

2.03. STANDARD STEEL DOORS:

A. Provide metal doors of types and styles indicated on below or as indicated on schedules.

B. Comply with ANSI 250.8 (1998) or SDI-100 requirements as follows:

1. Interior Doors: SDI-100, Grade II, heavy-duty, Model 1, minimum 18 gauge faces.
2. Exterior Doors: SDI-100, Level III, extra heavy-duty, Model 2, 16 gage faces.

C. Sounded Rated Doors: where shown or scheduled, provide doors which have been fabricated as sound reducing type, tested in accordance with ASTM E 90, and classified in accordance with ASTM E 413.

1. Unless otherwise indicated, provide doors with sound ratings of STC 50 or better.

2.04. STANDARD STEEL FRAMES:

A. Provide metal frames for doors, transoms, windows and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of cold-rolled furniture steel as noted below:

1. Fabricate frames with mitered and welded corners, ground smooth.
2. Form exterior frames from 14 gage steel.
3. Form interior frames from 16 gage steel.

B. Door Silencers: Drill stops to receive 3 silencers on strike jambs of single-swing frames.

C. Plaster Guards: Provide 26-gage steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

2.05. FABRICATION, GENERAL:

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with ANSI250.8/SDI-100 requirements.

B. Internal Construction: Manufacturer's standard honeycomb, polyurethane, polystyrene, unitized steel grid, vertical steel stiffeners, or rigid mineral fiber core with internal sound deadener on inside of face sheets where appropriate in accordance with SDI standards.

C. Clearances: Not more than 1/8 inch at jambs and heads; Not more than 3/4 inch at bottom.

D. Fabricate exposed faces of doors from only cold-rolled steel.

E. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.

F. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

G. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

H. Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

I. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

J. Locate finish hardware as indicated in Section 06 4100 "Finish Carpentry."

K. Shop Painting:

L. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

M. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

N. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

O. Glazing Stops: Minimum 20 gage steel or .040-inch-thick aluminum.

1. Provide non-removable stops on outside of exterior doors for glass, louvers, and other panels in doors.
2. Provide screw applied removable glazing beads on inside of glass, louvers, and other panels in doors.

PART 3 - EXECUTION

3.01. INSTALLATION:

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

1. Except for frames located at masonry and at drywall installations, place frames prior to construction at enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
2. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with tapping screws.

C. Door Installation:

D. Fit hollow metal doors accurately in frames, within clearances specified in SDI-100.

3.02. ADJUST AND CLEAN:

A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

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SECTION 08 2000
WOOD DOORS

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02. SUMMARY

A. Section Includes:
   1. Solid-core doors with wood-veneer MDO and plastic-laminate faces.
   2. Factory finishing flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.03. SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
   1. Dimensions and locations of blocking.
   2. Dimensions and locations of mortises and holes for hardware.
   3. Dimensions and locations of cutouts.
   4. Undercuts.
   5. Requirements for veneer matching.
   6. Doors to be factory finished and finish requirements.
   7. Fire-protection ratings for fire-rated doors.

C. Samples for Verification:
   1. Plastic laminate, 6 inches (150 mm) square, for each color, texture, and pattern selected.
   2. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.04. DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.05. FIELD CONDITIONS

A. A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.06. WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Source Limitations: Obtain flush wood doors from single manufacturer.

2.02. FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
   1. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.

B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

D. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
   3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
   4. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

F. Particleboard-Core Doors:
   1. Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2, made with binder containing no urea-formaldehyde.
   2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
   3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

G. Structural-Composite-Lumber-Core Doors:
   1. Structural Composite Lumber: WDMA I.S.10.
      a. Screw Withdrawal, Face: 700 lbf.
      b. Screw Withdrawal, Edge: 400 lbf.

H. Mineral-Core Doors:
   1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
   2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.

3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
    a. Screw-Holding Capability: 475 lbf per WDMA T.M.-10.

2.03. VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors :
    1. Grade: Custom (Grade A faces).
    2. Match between Veneer Leaves: Slip match.
    3. Assembly of Veneer Leaves on Door Faces: Balance match.
    4. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
    5. Exposed Verticaland Top Edges: Same species as faces or a compatible species - edge Type A.
    6. Core: Particleboard Structural composite lumber.
    7. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
    8. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.04. DOORS FOR OPAQUE FINISH

A. Interior Solid-Core Doors :
    1. Grade: Custom.
    2. Faces: MDO.
        a. Apply MDO to standard-thickness, closed-grain, hardwood face veneers or directly to high-density hardboard crossbands.
        b. Hardboard Faces: ANSI A135.4, Class 1 (tempered) or Class 2 (standard).
        c. MDF Faces: ANSI A208.2, Grade 150 or Grade 160.
    3. Exposed Verticaland Top Edges: Any closed-grain hardwood.
    4. Core: Particleboard Structural composite lumber.
    5. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
    6. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.05. PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors <Insert drawing designation>:
    1. Grade: Custom.
    2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
    3. Colors, Patterns, and Finishes: As indicated.
    4. Exposed Verticaland Top Edges: Hardwood edges for staining to match faces.
    5. Core: Particleboard Structural composite lumber.
    6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before faces and crossbands are applied. Faces are bonded to core using a hot press.
    7. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.06. LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
    1. Wood Species: Same species as door faces.
    2. Profile: Flush rectangular beads.
    3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

C. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated.

D. Metal Louvers:

1. Blade Type: Vision-proof, inverted V.
2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

E. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.

1. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

2.07. FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

D. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 8000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.08. FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted ontop and bottom edges, edges of cutouts, and mortises.

B. Factory finish doors that are indicated to receive transparent finish.

C. Transparent Finish:

1. Grade: Custom.
2. Finish: WDMA TR-4 conversion varnish or WDMA TR-6 catalyzed polyurethane.
3. Staining: Match Architect's sample .
4. Sheen: Satin.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.
   1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.02. INSTALLATION

A. Hardware: For installation, see Section 08 7100 "Finish Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
   1. Install fire-rated doors according to NFPA 80.
   2. Install smoke- and draft-control doors according to NFPA 105.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.03. ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

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SECTION 08 3100
ACCESS DOORS & FRAMES

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 access doors and frames for walls and ceilings.

1.03. ALLOWANCES

A. Access doors and frames are part of an access door and frame allowance.

1.04. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3000.

B. Product Data: For each type of product.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

C. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.

D. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.01. PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

2.02. ACCESS DOORS AND FRAMES

A. Flush Access Doors with Concealed Flanges :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Babcock-Davis.
    b. JL Industries, Inc.; a division of the Activar Construction Products Group.
    c. Karp Associates, Inc.
    d. Larsens Manufacturing Company.
    e. Milcor; Commercial Products Group of Hart & Cooley, Inc.
    f. Nystrom, Inc.
2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
3. Uncoated Steel Sheet for Door: Nominal 0.060 inch , 16 gage, factory primed.
4. Stainless-Steel Sheet for Door: Nominal 0.062 inch , 16 gage, No. 4 finish.
5. Frame Material: Same material and thickness as door.
6. Latch and Lock: Cam latch, key operated.

B. Recessed Access Doors with Concealed Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Babcock-Davis.
   b. JL Industries, Inc.; a division of the Activar Construction Products Group.
   c. Lane-Aire Manufacturing Corp.
   d. Larsens Manufacturing Company.
   e. Milcor; Commercial Products Group of Hart & Cooley, Inc.
   f. Nystrom, Inc.
2. Description: Door face recessed 5/8 inch for gypsum board infill; with concealed flange for board installation and concealed hinge.
3. Uncoated Steel Sheet for Door: Nominal 0.060 inch , 16 gage, factory primed.
4. Stainless-Steel Sheet for Door: Nominal 0.062 inch , 16 gage, No. 4 finish.
5. Latch and Lock: Cam latch, key operated.

2.03. FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Concealed Flanges Insert drawing designation:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Babcock-Davis.
      b. JL Industries, Inc.; a division of the Activar Construction Products Group.
      c. Karp Associates, Inc.
      d. Nystrom, Inc.
   2. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with concealed flange for gypsum board installation, self-closing door, and concealed hinge.
   3. Fire-Resistance Rating: Not less than that of adjacent construction.
   4. Uncoated Steel Sheet for Door: Nominal 0.036 inch , 20 gage, factory primed.
   5. Stainless-Steel Sheet for Door: Nominal 0.038 inch , 20 gage, No. 4 finish.
   6. Latch and Lock: Self-closing, self-latching door hardware, operated by key.

2.04. MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

D. Frame Anchors: Same material as door face.

E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.05. FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
   1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.

1. For recessed doors with plaster infill, provide self-furring expanded-metal lath attached to door panel.

2.06. FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

E. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.03. ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

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SECTION 08 4100
ALUMINUM STOREFRONTS AND ENTRANCES

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Aluminum-framed storefronts

1.02. REFERENCES

A. MMA CW-10 -Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 1997.

B. MMA602.2

C. MMA 701.2

D. ASTM E 330 -Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1997.

E. ASTMA386

1.03. PERFORMANCE REQUIREMENTS

A. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

B. Thermal Movement: Fabricate exterior components from manufacturers stock systems which have been designed to provide for expansion and contraction resulting from ambient temperature range of 100 deg F.

C. Wind Loading: Fabricate exterior components from manufacturers stock systems which have been tested in accordance with ASTM E 330 to withstand at least 15 psf uniform wind loading.

D. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.

1.04. SUBMITTALS

A. See Section 01 3000 -Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Manufacturers Certificate: Certify that the products supplied meet or exceed the specified requirements.

1.05. QUALITY ASSURANCE

A. Manufacturer is specified to establish quality and design intent. Another standard system of a similar and equivalent nature will be acceptable when differences do not materially detract from design concept or intended performances, as judged solely by Architect.

B. Field Measurement: Wherever possible, take field measurements prior to preparation of shop drawings and fabrication, to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay work.

1.06. DELIVERY, STORAGE, AND PROTECTION

A. Deliver, store, and handle all materials of this section as recommended by AAMA CW-10 and as required to fully protect material from damage, soiling, and other conditions detrimental to the product, its appearance and function.

1.07. 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. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Kawneer Company, Inc; Product Tri-Fab.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.02. COMPONENTS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.03. FINISHES

A. Kawneer Permanodic® AA-M12C22A44, AAMA 611, Architectural Class I Color Anodic Coating (Color #40 Dark Bronze).

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.04. FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and comers. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce framing members for imposed loads.

G. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.

1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

3.02. INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Tum up ends and edges; seal to adjacent work to form water tight dam.

G. Coordinate attachment and seal of perimeter air and vapor barrier materials.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Install glass in accordance with Section 08 8000 - GLAZING, using glazing method required to achieve performance criteria.

J. Install perimeter sealant in accordance with Section 07 9000 - JOINT SEALANTS.

3.03. ERECTION TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04. CLEANING AND PROTECTION

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

D. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

E. Protect finished work from damage.

3.05. FINISHED WORK:

A. Aluminum storefront shall be true to lines and levels indicated with adequate provisions for thermal expansion/contraction.

B. Exposed surfaces shall be clean and free of defects and with all cut or drilled edges concealed or finished to match adjacent surface finish.

C. Other areas shall be free of debris and damage from work of this section.

END OF SECTION

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SECTION 08 7100
HARDWARE

PART 1 - GENERAL

1.01. RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

1.02. DESCRIPTION OF WORK:

A. Definition: "Builders Hardware" includes items known commercially as builders hardware which are required for swing doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

B. Extent of finish hardware required is indicated on drawings and in schedules.

C. Types of finish hardware required include the following:

1. Hinges
2. Lock cylinders and keys
3. Lock and latch sets
4. Bolts
5. Push/pull units
6. Closers
7. Miscellaneous door control devices
8. Protection plates
9. Sound stripping for interior doors

D. Silencers included integral with hollow metal frames are specified with door frames elsewhere in Division 8.

1.03. QUALITY ASSURANCE:

A. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced architectural hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.

1.04. SUBMITTALS:

A. Product Data: Submit manufacturers technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

B. Hardware Schedule: Submit hardware schedule in manner similar to schedule at end of section. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Include the following information:

1. Type, style, function, size and finish of each hardware item.
   a. Name and manufacturer of each item.
   b. Fastenings and other pertinent information.
   c. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
   d. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
   e. Mounting locations for hardware.
   f. Door and frame sizes and materials.

g. Keying information.

C. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.

D. Samples: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.

1. Samples will be returned to the supplier. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

E. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.05. PRODUCT HANDLING:

A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of hardware is the responsibility of the supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

E. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 - PRODUCTS

2.01. SCHEDULED HARDWARE:

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Finish Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.

1. Manufacturer's product designations: One manufacturers is listed for each hardware type required for purposes of establishing minimum requirements. Provide either the product designated, or comparable products of the other manufacturers which comply with requirements including those specified elsewhere in this section.

2.02. MATERIALS AND FABRICATION:

A. General:

B. Hand of door: Drawings show direction of swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

C. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

D. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of

lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

E. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

F. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

G. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

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

2.03. HINGES, BUTTS AND PIVOTS:

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

B. Screws: Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.

C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1. Steel Hinges: Steel pins.
2. Non-ferrous Hinges: Stainless steel pins.
3. All Doors: Non-rising, non-removable pins.
4. Tips: Flat button and matching plug, finished to match leaves.
5. Number of hinges: Provide number of hinges indicated.
6. Size: As required for proper operation - 4 1/2" x 4 1/2" minimum.
7. Finish: Hinge finish shall be US 26D - Satin Chrome.

2.04. LOCK CYLINDERS AND KEYING:

A. General: Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.

B. Review the keying system with the Owner and provide the type required (master, grand-master or great-grandmaster), either new or integrated with Owner's existing system.

C. Equip locks with manufacturer's standard 6-pin tumbler cylinders ("E" type keyway). Furnish a construction master key system with 10 keys for locks and cylinder use only during construction.

D. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.

E. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

1. Deliver keys to Owner's representative. Provide factory keys to locks with #1 cut. Factory stamp permanent keys "DO NOT DUPLICATE".

F. Key Material: Provide keys of nickel silver only.

G. Key Quantity: Furnish 3 change keys for each lock; 5 master keys for each master system; and 5 grandmaster keys for each grandmaster system.

2.05. LOCKS, LATCHES AND BOLTS:

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

B. Lock Throw: Provide 5/8" minimum throw of latch and 1" minimum throw of deadbolt.

C. Flush Bolt Heads: Minimum of ½" diameter rods of bras, bronze or stainless steel, with minimum 12" log rod for dors up to 7'-0" in height.

D. Lockset: Schlage Lock Co., "D" series units as specified. 2 3/4" backset except where scheduled otherwise. Lever design shall be "Rhodes" US 26D - Satin Chrome finish.

2.06. CLOSERS AND DOOR CONTROL DEVICES:

A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

1. Where parallel arms are indicated for closers, provide closer unit one size larger than recommended for use with standard arms.

B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A 117.1 provisions for door opening force and delayed action closing.

C. Flush Floor Plates: Provide finished metal flush floor plates for floor closers. Finish floor plate to match hardware sets.

2.07. DOOR TRIM UNITS:

A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units (kick plates, and similar units); either machine screws of self-tapping screw.

B. Fabricate edge trim of stainless steel, not more than ½" nor less than 1/16" smaller in length than door dimension.

C. Fabricate protection plates (kick or mop) not more than 1 ½" less than door width on stop side and not more than ½" less than door width on pull side, x height indicated.

1. Metal Plates: Stainless steel, .050" (U.S. 18 ga.).

2.08. WEATHERSTRIPPING:

A. General: Except as otherwise indicated, provide continuous weatherstripping at each edge of every exterior door leaf. Provide type, size, and profiles shown or scheduled. Provide non-corrosive fasteners as recommended by manufacturer for application indicated.

B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

C. Provide bumper-type resilient insert and metal retainer strips surface-applied as noted on schedule.

2.09. HARDWARE FINISHES:

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock for color and texture.

B. Provide finishes which match those as noted by the Architect.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.

D. The designations used in schedules and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.

PART 3 - EXECUTION

3.01. INSTALLATION:

A. Mount hardware units at "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.02. 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 surfaces soiled by hardware installation.

C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, 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 HVAC.

D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

E. The following schedule includes hardware to be furnished and installed under this Section. Verify all field conditions and furnish additional and/or accessories as required to provide a complete installation - with all openings operating properly.

1. Numbers on attached schedule are from the following manufacturers. Do not substitute without approval of Architect.
    a. Hinges, Butts:..... Hager
    b. Locks and Latchsets: ..... Schlage
    c. Closers:..... LCN
    d. Gasketing/Seals:..... Pemko
    e. Door Stops:..... IVES
    f. Door Protection:..... IVES

3.03. HARDWARE SCHEDULE

A. See drawings for hardware schedule.

END OF SECTION

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SECTION 08 8000
GLAZING

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.02. REFERENCES

A. ANSI Z97.1 -American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 1984 (R1994).

B. ASTM C 864 -Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 1999.

C. GANA (GM) -GANA Glazing Manual; Glass Association of North America; 1997.

D. GANA (SM) -FGMA Sealant Manual; Glass Association of North America; 1990.

1.03. PERFORMANCE REQUIREMENTS

A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:

1. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

B. The glass shall withstand all loads required by the governing authorities. Notify Architect where there is a conflict between the requirements and the glass specified.

C. Thicknesses listed are minimum.

D. Fire door assemblies including the glazing shall be installed in accordance with the provisions of CBC Section 716 and NFPA 80

E. Fire rated assemblies and marking shall be in accordance with CBC 716.3, T716.5, and T716.6 Title 24, Part 2, California Building Code (CBC 2013 Edition)

1.04. SUBMITTALS

A. See Section 01 3000 -Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Samples: Submit two samples 12x12 inch in size of glass units, showing coloration.

1.05. QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual, and FGMA Sealant Manual for glazing installation methods.

B. Fire resistance rated wire glass: Provide wire glass products that are identical to those tested per ASTM E 163 (UL 9) and are labeled and listed by UL ore other testing and inspecting agency acceptable to authorities having jurisdiction.

C. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies.

D. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per UL 10B, classified and labeled by UL.

E. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years documented experience.

1.06. ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07. WARRANTY

A. See Section 01 7800 -Closeout Submittals, for additional warranty requirements.

B. Provide a five (5) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 - PRODUCTS

2.01. FLAT GLASS MATERIALS

A. Lead Glazing: see Section 13 4900.

B. Wired glass: Type II patterned and wired glass, flat), Class 1 (translucent), Quality q8 (glazing); complying with ANSI Z97.1; ¼" thick; of form and mesh pattern indicated below:

1. Polished wire glass: Form 1 (wired, polished both sides), Mesh m1 (diamond)
2. Polished wire glass: Form 1 (wired, polished both sides), Mesh m2 (square)
3. Patterned wire glass: Form 2 (patterned and wired), Mesh m1 (diamond)

C. Non-wired fire rated glass:

1. Fire-rated glass ceramic: FireLite® as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products
2. Fire-rated, safety-rated glass ceramic: FireLite Plus® as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products

2.02. GLAZING COMPOUNDS

2.03. GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; Black color.

2.04. SOURCE QUALITY CONTROL AND TESTS

A. Test samples in accordance with ANSI Z97.1.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02. PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

3.03. INSTALLATION· EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

A. Place setting blocks at 1/4 points with edge block no more than 6 inches from comers.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.04. CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.05. PROTECTION OF FINISHED WORK

A. After installation, mark: pane with an 'X' by using removable plastic tape or paste; do not mark: heat absorbing or reflective glass units.

END OF SECTION

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SECTION 09 2900
GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Metal stud wall framing.

B. Acoustic insulation.

C. Cementitious backer board.

D. Gypsum wallboard.

E. Joint treatment and accessories.

F. Textured finish system.

1.02. REFERENCES

A. ASTM C *36/C* 36M -Standard Specification for Gypsum Wallboard; 1999.

B. ASTM C *79/C* 79M -Standard Specification for Treated Core and Nontreated Core Gypsum Sheathing Board; 1997.

C. ASTM C 475 -Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 1994.

D. ASTM C 630/C 630M -Standard Specification for Water-Resistant Gypsum Backing Board; 1996a.

E. ASTM C 754 -Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 1999a.

F. ASTM C 840 -Standard Specification for Application and Finishing of Gypsum Board; 1999.

G. ASTM C 919 -Standard Practice for Use of Sealants in Acoustical Applications; 1998.

H. ASTM C 1002 -Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases; 1998.

I. GA-216 -Application and Finishing of Gypsum Board; Gypsum Association; 2000.

J. GA-600 -Fire Resistance Design Manual; Gypsum Association; 2000.

1.03. SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, joint finishing system , and acoustical insulation and sealants.

C. Samples: Prepare a wall surface to each of the the finishes specified and notify the Architect for his review. The walls selected shall be walls specified to receive the finish. The Architect reserves the right to make minor adjustments in the finish without incurring additional costs.

D. These walls, when accepted by the Architect, will become the standard for all walls specified to receive a similar finish.

1.04. QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

1.05. REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as indicated on drawings.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Gypsum Board:
   1. G-P Gypsum Corp.
   2. National Gypsum Co.
   3. United States Gypsum Co.
   4. Pabco Gypsum Co.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02. METAL FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties indicated.
   1. Studs: C shaped with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Furring: Hat-shaped sections, minimum depth of *3/4* inch.

2.03. GYPSUM BOARD MATERIALS

A. Standard Gypsum Wallboard: ASTM C 36/C 36M; sizes to minimize joints in place; ends square cut.
   1. Thickness: 5/8 inch.
   2. Edges: Tapered.

B. Fire Rated Gypsum Wallboard: ASTM C 36/C 36M; Type X, UL or WH rated; sizes to minimize joints in place; ends square cut.
   1. Thickness: 5/8 inch.
   2. Edges: Tapered.

C. Moisture-Resistant Gypsum Backing Board: ASTM C 630/C 630M; ends square cut.
   1. Thickness: 5/8 inch.
   2. Edges: Tapered.

D. Gypsum Sheathing Board: ASTM C 79/C 79M; moisture resistant and fire resistant type; sizes to minimize joints in place; water repellent paper faces; ends square cut.
   1. 1. Thickness: 5/8 inch.

E. Cementitious Backer Board: High density, glass fiber reinforced, 5/8 inch thick.
   1. 1. Tape: 2 inch wide, coated glass fiber tape for joints and comers.

F. Abuse Resistant Panel: Tough rock Abuse-Resistant Gypsum Board, ASTM C-36, Type-X, as manufactured by G-P Gypsum Corporation (800) 225-6119.
   1. Thickness: 5/8 inch.
   2. Edges: Tapered.

G. Sound Reducing Gypsum Wallboard: ASTM C 36/C 36M; Type X, UL or WH rated; sizes to minimize joints in place; ends square cut.
   1. Thickness: 5/8 inch.
   2. Edges: Tapered.

2.04. ACCESSORIES

A. Acoustic Insulation: Therma fiber 3-inch Creased SAFB as manufactured by USG Interiors, (510) 792-4400.

B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.

C. Corner Beads: Galvanized steel.

D. Edge Trim: Bead type(s) as detailed.

E. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.

F. Textured Finish Materials: Latex-based compound; plain.

G. Screws: ASTM C 1002; self-drilling type; cadmium-plated for exterior locations.

H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 - EXECUTION

3.01. EXAMINATION:

A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02. PREPARATION:

A. Ceiling Anchorages: Coordinate installation of ceiling suspension with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

3.03. INSTALLATION OF STEEL FRAMING, GENERAL:

A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer, of if nonavailable, with "Gypsum Construction Handbook" published by United States Gypsum Co.

C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to comply with details shown on Drawings:

1. Where edges of suspended ceilings abut building structure horizontally at ceiling perimeters or penetration of structural elements.
2. Where partitions and wall framing abuts overhead structure.

D. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

3.04. INSTALLATION OF STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS:

A. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to cast-in concrete inserts or other anchorage devices or fasteners as indicated.

B. Do not connect or suspend steel framing from ducts, pipes or conduit.

C. Keep hangers and braces 2 inches clear of ducts, pipes and conduits.

D. Sway-brace suspended steel framing with hangers used for support.

E. Install suspended steel framing components in sizes and at spacing indicated but not less than that required by referenced steel framing installation standard.

1. Wire Hangers: 0.1620 inch diameter (8 gage), 4 ft. on center.
2. Carrying Channels (Main Runners): 1-1/2 inch, 4 ft. on center.
3. Rigid Furring Channels (Furring Members): 16 inches on center.

F. Installation Tolerances: Install steel framing components for suspended ceilings so that the cross furring members or grid suspension members are level to within 1/8 inch in 12 ft. as measured both lengthwise on each member and transversely between parallel members.

G. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

H. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross furring members to each other and butt-cut to fit into wall track.

3.05. INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS:

A. Install runners (tracks) at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other construction.

B. Installation Tolerances: Install each steel framing and furring member so that fastening surface do not vary more than 1/8 inch from plane of faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

D. Terminate partition framing at suspended ceilings where indicated.

E. Install steel studs and furring in sizes and at spacings indicated, but not less than that required by referenced steel framing installation standard.

1. For single layer construction: 16 inches on center.

F. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.

G. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

H. Frame openings other than door openings to comply with details indicated or if none is indicated, in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.

3.06. APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum board to comply with ASTM C 840.

B. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.

C. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 24 inches.

D. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.

E. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.

F. Located either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

G. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.

H. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

I. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32 inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.

J. Form control joints and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.

K. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are properly braced internally.

1. Except where concealed application is indicated or required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area and may be limited to not less than 75 percent of full coverage.
2. Fit gypsum board around ducts, pipes, and conduits.
3. Where partitions intersect open concrete coffers, cut gypsum board to fit profile of coffers and allow 1/4 to 1/2 inch wide joint for sealant.

L. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.

M. Where sound-rated drywall construction is indicated, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.

N. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.07. METHODS OF GYPSUM DRYWALL APPLICATION:

A. Single-layer Application: Install gypsum wallboard as follows:

1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
2. On partitions/walls apply gypsum board horizontally unless otherwise indicated and provide sheet lengths which will minimize end joints.

B. Wall Tile Base: Where drywall is base for thin-set ceramic tile and similar rigid applied wall finishes, install gypsum backing board.

1. In "dry" areas install gypsum backing board or wallboard with tapered edges taped and finished to produce a flat surface.

C. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:

1. Fasten with screws.

D. Direct Bonding to Substrate: Where gypsum board is indicated to be directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufactures' recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

3.08. INSTALLATION OF GLASS MAT UNITS

A. Attach glass mat units to substrate in a manner acceptable to both the glass mat units manufacturer and Exterior Insulation and Finish Systems manufacturer.

3.09. INSTALLATION OF DRYWALL TRIM ACCESSORIES:

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturers' recommendations.

B. Install metal corner beads at external corners.

C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.

1. Install 'LC' bead where drywall construction tightly abuts other construction and back flange can be attached to framing or supporting substrate.

2. Install 'L' bead where trim can only be installed after gypsum board.

D. Install control joints at locations indicated, or if not indicated, at spacing and locations required by referenced gypsum board application and finish standard and approved by the Architect for visual effect.

3.10. FINISHING OF DRYWALL:

A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects.

B. Pre-fill open joints and rounded or beveled edges, if any, using setting-type joint compound.

C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

D. Finish gypsum wallboard by applying the following joint compounds in 3 coats (not including pre-fill of openings in base), and sand between coats and after last coat:

1. Embedding and First Coat: Ready-mix drying-type all-purpose or taping compound.
2. Fill (Second) Coat: Ready-mix drying-type all-purpose or topping compound.
3. Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound.

E. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.11. APPLICATION OF TEXTURE FINISH:

A. Surface Preparation and Primer: Prepare and prime drywall and other surfaces in strict accordance with texture finish manufacturer's instructions. Apply primer to all surfaces to achieve texture finish.

B. Finish Application: Mix and apply finish to drywall and other surfaces indicated to receive finish in strict accordance with manufacturer's instructions to produce a uniform texture matching Architect's sample without starved spots or other evidence of thin application, and free of application patterns.

1. Texture applied to walls shall have an "orange peel" appearance.

C. Remove any texture droppings or overspray from door frames, windows and other adjoining work.

3.12. PROTECTION:

A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

PART 4 - FIELD QUALITY CONTROL

4.01. EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

4.02. FRAMING INSTALLATION

A. Metal Framing: Comply with ASTM C 754 and manufacturer's instructions.

B. Studs: Space studs as indicated.

1. Extend stud framing through ceiling to structure above as indicated. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.

C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double 16 ga studs at jambs.

D. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.

E. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, and hardware. Bolt or screw steel channels to studs.

4.03. 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 as follows:

1. Install/ per ASTM C 919
2. Place two beads continuously on substrate before installation of perimeter framing members.
3. Place continuous bead at perimeter of each base layer of gypsum board.
4. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

4.04. GYPSUM BOARD INSTALLATION

A. Comply with ASTM C 840. 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. Single-Layer Fire-Rated: Install gypsum board vertically, with edges and ends occurring over firm bearing.

D. Gypsum Sheathing: Install horizontally, with edges butted tight and ends occurring over firm bearing.

E. Cementitious Backing Board: Install over metal studs, in accordance with manufacturer's instructions.

F. Abuse Resistant Panel: Install per manufacturer's instructions.

G. Installation on Metal Framing: Use screws for attachment of all gypsum board.

H. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board, and exterior gypsum soffit board with sealant.

4.05. INSTALLATION OF TRIM AND ACCESSORIES

A. Comer Beads: Install at external comers, using longest practical lengths.

B. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

4.06. JOINT TREATMENT

A. Finish gypsum board in scheduled areas in accordance with levels defined in ASTM C 840 and as scheduled below.

B. Fill and finish joints and comers of cementitious backing board.

4.07. TEXTURE FINISH, IF ANY

A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

4.08. TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

4.09. FINISH LEVEL SCHEDULE

A. Level 1: Above finished ceilings concealed from view.

B. Level 2: Utility areas and areas behind cabinetry.

C. Level 3: Walls scheduled to receive textured wall finish.

D. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.

E. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

END OF SECTION

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SECTION 09 3000
TILE

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. 1.2 SUMMARY

A. Section Includes:
   1. Porcelain tile.
   2. Glazed wall tile.
   3. Solid-surface material thresholds.
   4. Waterproof membrane for thin set applications.
   5. Crack isolation membrane.
   6. Metal edge strips.

B. Related Requirements:
   1. Section 07 9000 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
   2. Section 09 2900 "Gypsum Board" for glass-mat, water-resistant backer board.

1.03. 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.

B. 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."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

E. Wet Area: The term "wet area" refers to shower rooms and other areas with similar usages. It does not refer to toilet rooms and other similar areas where water on the floor is seldom encountered.

1.04. PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.05. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3000 "Administrative Requirements."

B. Product Data: For each type of product.

C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

D. Samples for Verification:
   1. Full-size units of each type and composition of tile and for each color and finish required. For mosaic tile in color blend patterns, provide full sheets of each color blend.

2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Solid-surface material thresholds 6-inch lengths.
5. Metal edge strips in 6-inch lengths.

1.06. MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
   2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.07. QUALITY ASSURANCE

A. Installer Qualifications:
   1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
   2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
   3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

B. Provide the following upon request:
   1. Qualification Data: For Installer.
   2. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
   3. Product Certificates: For each type of product.
   4. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

C. Installation Method: All tile greater than 12 inches in either dimension shall be installed with the Tuscan Leveling System to control lippage and other related installation control activities.
   1. Installation guidelines available at: www.tuscanleveling.com.

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08. DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained, and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.09. FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
   1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials:
   1. Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
   2. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
   3. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
   1. Solid-surface material thresholds.
   2. Waterproof membrane.
   3. Crack isolation membrane.
   4. Cementitious backer units.
   5. Metal edge strips.

2.02. PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Dynamic Coefficient of Friction: Provide tile installed on walkway surfaces with dynamic coefficient of friction indicated as determined by testing identical products per ANSI A13.7.1 DCOF AcuTest procedure.
   1. Dynamic Coefficient of Friction: Not less than 0.42.

D. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
   1. Where tile is indicated for installation [in swimming pools] [on exteriors] [or] [in wet areas], do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.03. TILE PRODUCTS

a. TBD

2.04. THRESHOLDS

A. Solid-Surface Material Thresholds: Homogeneous solid thresholds of filled plastic resin complying with ANSI SS1.
   1. Type: Standard Type.
   2. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.05. TILE BACKING PANELS

A. Specified in Section 09 2900 "Gypsum Board."

2.06. WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric.

1. Products: Subject to compliance with requirements, provide the following:
   a. Noble Company (The); Nobleseal TS.
2. Nominal Thickness: 0.040 inch.

2.07. CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch nominal thickness.

1. Products: Subject to compliance with requirements, provide the following:
   a. Noble Company (The); Nobleseal CIS.

2.08. SETTING MATERIALS

A. Medium-Bed, Modified Dry-Set Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 5/8 inch.

1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.

B. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.

1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
2. For wall applications, provide mortar that complies with requirements for non sagging mortar in addition to the other requirements in ANSI A118.15.

2.09. GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.10. MISCELLANEOUS MATERIALS

A. Trowelable Underlayment's and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.11. MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
   a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
   b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trawlable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.03. CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
   a. Tile floors in wet areas.
   b. Tile floors consisting of tiles 8 by 8 inches or larger.
   c. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
   1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
   2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
   3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
   1. Glazed Wall Tile: 1/8 inch.
   2. Porcelain Tile: 1/4 inch.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

J. Metal Edge Strips: Install at locations indicated.

3.04. WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.05. CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.06. 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. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove grout residue from tile as soon as possible.
   2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.07. PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.08. INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:
   1. Ceramic Tile Installation: TCNA F115; thinset mortar; epoxy grout.
      a. Ceramic Tile Type: TBD.
      b. Thinset Mortar: Medium-bed, modified dry-set] mortar.
      c. Grout: Water-cleanable epoxy grout.
   2. Ceramic Tile Installation: TCNA F122; thinset mortar on waterproof membrane.
      a. Thinset Mortar: Improved modified dry-set mortar.
      b. Grout: Water-cleanable epoxy grout.
   3. Ceramic Tile Installation: TCNA F125-Full; thinset mortar on crack isolation membrane.
      a. Thinset Mortar: Improved modified dry-set mortar.
      b. Grout: Water-cleanable epoxy grout.

B. Interior Wall Installations, Wood or Metal Studs or Furring:
   1. Ceramic Tile Installation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.
      a. Thinset Mortar: Improved modified dry-set mortar.
      b. Grout: Water-cleanable epoxy grout.
   2. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.
      a. Ceramic Tile Type: TBD.
      b. Thinset Mortar: Improved modified dry-set mortar.
      c. Grout: Water-cleanable epoxy grout.

END OF SECTION

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SECTION 09 5100
ACOUSTICAL PANEL CEILINGS

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 acoustical panels and exposed suspension systems for interior ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.03. PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.04. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3000 "Administrative Requirements."

B. Product Data: For each type of product.

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of 6-inch- square Samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.05. INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Structural members to which suspension systems will be attached.
3. Method of attaching hangers to building structure.
    a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    a. Lighting fixtures.
    b. Diffusers.
    c. Grilles.
    d. Speakers.
    e. Sprinklers.
    f. Access panels.
    g. Perimeter moldings.
7. Minimum Drawing Scale: 1/4 inch = 1 foot.

1.06. CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.07. MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
   2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
   3. Hold-Down Clips: Equal to 2 percent of quantity installed.
   4. Impact Clips: Equal to 2 percent of quantity installed.

1.08. QUALITY ASSURANCE

A. Provide the following upon request:
   1. Qualification Data: For testing agency.
   2. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
   3. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
   4. Field quality-control reports.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockup of typical ceiling area as shown on Drawings.
   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 if undisturbed at time of Substantial Completion.

1.09. DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.10. FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
   1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.02. PERFORMANCE REQUIREMENTS

A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 as amended by 2019 CBC Section 1617A

C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: Class A according to ASTM E 1264.
   2. Smoke-Developed Index: 50 or less.

D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing E. agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.03. ACOUSTICAL PANELS

A. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

2.04. METAL SUSPENSION SYSTEM

A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.
   1. Structural Classification: Heavy-duty system.
   2. End Condition of Cross Runners: butt-edge type.
   3. Face Design: Flat, flush.
   4. Cap Material: Cold-rolled steel.
   5. Cap Finish: Painted white.

2.05. ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1,"Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
   1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
      a. Type: Cast-in-place post-installed expansion Post-installed bonded anchors.
      b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633, Class SC 1 (mild) service condition.
   2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:
   1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
   2. Size:
      a. Hanger Wire Size: 0.106 inch (No. 12-gauge) diameter wire.
      b. Seismic Bracing Wire Size: 0.106 inch (No. 12-gauge) diameter wire.
      c. Slack Safety Wire Size: 0.106 inch (No. 12-gauge) diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Hold-Down Clips: Manufacturer's standard hold-down.

E. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

F. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

H. Clean-Room Gasket System: Where indicated, provide manufacturer's standard system, including manufacturer's standard gasket and related adhesives, tapes, seals, and retention clips, designed to seal out foreign material from and maintain positive pressure in clean room.

2.06. METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

B. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.03. INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
2. Seismic Design Requirements: Install in accordance with the following:
   a. ASTM E 580/E 580M for Seismic Design Categories D, E, and F.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, counters playing, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post installed anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim unless otherwise noted on drawings.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
   a. As indicated on reflected ceiling plans.
2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Install seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
   a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
7. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
8. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.04. ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.05. FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.

1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and post installed anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two post installed anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.06. CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 6500
RESILIENT FLOORING

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient sheet flooring

C. Resilient base.

D. Installation accessories.

1.02. REFERENCES

A. ASTM E 648 -Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 1999.

B. ASTM F 1861 -Standard Specification for Resilient Wall Base; 1998.

C. NFPA 253 -Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 1995.

1.03. SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes. patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturers complete set of color samples for Architect's initial selection.

D. Verification Samples: Submit three samples. 12x12 inch in size illustrating color and pattern for each resilient flooring product specified.

E. Shop Drawings: For each type of flooring. Include flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

F. Certifications: Submit a certification signed by the manufacturer and installer stating that the resilient flooring has been installed as specified and in accordance with fire-test response characteristics

G. Maintenance Data: Include maintenance procedures recommended maintenance materials and suggested schedule for cleaning, stripping, and re-waxing.

1.04. DELIVERY, STORAGE, AND PROTECTION

A. Protect roll materials from damage by storing on end.

B. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Resilient Sheet Flooring: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed

1.05. ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. 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.

1.06. QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
   1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

B. Provide the following upon request;
   1. Qualification Data: For Installer

PART 2 - PRODUCTS

2.01. MATERIALS -TILE FLOORING

A. Substitutions: See Section 01 6000 - Product Requirements.

B. Vinyl Tile: Solid vinyl with color and pattern throughout thickness, and:
   1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, or NFPA 253.
   2. Manufacturers:
      a. Armstrong; Product Classic Travertine, color as selected by Architect.
      b. Substitutions: See Section 01 6000 -Product Requirements.

2.02. MATERIALS – BASE

A. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
   1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, or NFPA 253.
   2. Height: 6 inch.
   3. Thickness: 0.125 inch thick.
   4. Finish: Satin.
   5. Color: Color as selected from manufacturer's standards.
   6. Accessories: Pre-molded external comers, and end stops.
   7. Manufacturers:
      a. BurkeMercer Flooring Products, Inc.
      b. Substitutions: See Section 01 6000 -Product Requirements.

2.03. MATERIALS – VINYL SHEET FLOORING WITH BACKING

A. Product Standard: ASTM F 1303.
   1. 1. Type (Binder Content): Type I, minimum binder content of 90 percent.
   2. 2. Wear-Layer Thickness: Grade 1.
   3. 3. Overall Thickness: As standard with manufacturer.
   4. 4. Backing Class: Class A (fibrous).

B. B. Wearing Surface: Embossed.

C. C. Sheet Width: As standard with manufacturer.

D. D. Seamless-Installation Method: Chemically bonded.

E. E. Colors and Patterns: As selected by Architect from full range of industry colors

2.04. ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.

1. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Seamless-Installation Accessories:

1. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
   a. Chemical-Bonding Compound shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Integral-Flash-Cove-Base Accessories:

1. Cove Strip: 1-inch radius provided or approved by resilient sheet flooring manufacturer.
2. Cap Strip: Square metal, vinyl, or rubber cap provided or approved by resilient sheet flooring manufacturer.

E. Moldings and Edge Strips: Same material as flooring.

F. Filler for Coved Base: Plastic.

G. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verify that concrete sub-floor surfaces 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.

B. Verify that required floor-mounted utilities are in correct location.

3.02. PREPARATION

A. Prepare substrates according to resilient flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

1. 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.
2. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
3. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient flooring manufacturer. Do not use solvents.
4. Alkalinity and Adhesion Testing: Perform tests recommended by resilient flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
5. Moisture Testing: Proceed with installation only after substrates pass testing according to resilient flooring manufacturer's written recommendations, but not less stringent than the following:
   a. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
   b. If water moisture tests exceed stated limits, apply vapor retarder for moisture vapor emission control as specified.
6. Fill cracks, holes, and depressions in substrates with trawlable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
7. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

B. Do not install resilient flooring until it is the same temperature as the space where it is to be installed.

1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient flooring.

3.03. INSTALLATION -TILE FLOORING

A. Install in accordance with manufacturer's instructions.

B. Mix tile from three containers to ensure shade variations are consistent when tile is placed.

C. Mix tile from container to ensure shade variations are consistent when tile is placed.

D. Spread only enough adhesive to permit installation of materials before initial set.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

G. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

H. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

J. Install flooring in recessed floor access covers. Maintain floor pattern.

3.04. INSTALLATION -BASE

A. Use longest lengths possible and fit joints tightly and make vertical.

B. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

C. Miter internal corners. At external corners, use pre-molded units. At exposed ends, use pre-molded units.

D. Install base on solid backing. Bond tightly to wall and floor surfaces.

E. Scribe and fit to door frames and other interruptions.

3.05. CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.06. PROTECTION OF FINISHED WORK

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 8433
ACOUSTICAL WALL PANELS

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 shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
   1. Sound-absorbing wall panels.

1.03. DEFINITIONS

A. NRC: Noise Reduction Coefficient.

B. SAA: Sound Absorption Average.

1.04. REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM C423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   3. ASTM E795: Standard Practices for Mounting Test Specimens During Sound Absorption Tests

1.05. PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.06. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3300 "Submittal Procedures."

B. Product Data: For each type of product.
   1. Include fabric facing, panel edge, core material, and mounting indicated.

C. Samples for Verification: For the following products:
   1. Fabric: 6”x6” Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
   2. Panel Edge: 6-inch- long Sample(s) showing each edge profile, corner, and finish.
   3. Core Material: 6-inch- square Sample at corner.
   4. Mounting Devices: Full-size Samples.

1.07. INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Electrical outlets, switches, and thermostats.
   2. Items penetrating or covered by units including the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Alarms.

e. Sprinklers.
f. Access panels.

1.08. CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.09. MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.10. QUALITY ASSURANCE

A. Provide the following upon request:
   1. Product Certificates: For each type of unit.

B. Qualifications:
   1. Manufacturers: Provide acoustical wall panels from a single manufacturer.
   2. Installers: Utilize an installer having demonstrated experience on projects of comparable size and complexity.

1.11. DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.12. FIELD CONDITIONS

A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Lighting: Do not install units until a permanent level of lighting is provided on surfaces to receive the units.

C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.13. WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to the following:
      a. Acoustical performance.
      b. Fabric sagging, distorting, or releasing from panel edge.
      c. Warping of core.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Acoustical Surfaces, Inc., 123 Columbia Court N, Chaska, MN 55318.Phone: 952-448-5300. Fax: 952-448-2613. Website: www.acousticalsurfaces.com

B. Substitutions: See Section 01 6000 -Product Requirements.

2.02. PERFORMANCE REQUIREMENTS

A. Units shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: Class A per ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.
2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.03. SOUND-ABSORBING WALL UNITS

A. Sound-Absorbing Wall Panel : Manufacturer's standard panel construction consisting of facing material stretched over front face of edge-framed core and bonded or attached to edges and back of frame.

1. Panel Shape: As indicated on Drawings.
2. Mounting: Edge mounted with splines secured to substrate.
3. Mounting: Back mounted with manufacturer's standard metal clips or bar hangers, secured to substrate.
4. Core: Manufacturer's standard .
5. Edge Construction: Manufacturer's standard chemically hardened core with no frame.

2.04. FABRICATION

A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Edge Hardening: For glass-fiber board and mineral-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.

C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. INSTALLATION

A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align fabric pattern and grain as indicated on Drawings.

3.03. INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches , noncumulative.

B. Variation of Joint Width: Not more than 1/16-inch variation from hairline in 48 inches , noncumulative.

3.04. CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 09 9000
PAINTS AND COATINGS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and other coatings.

C. Painting for Piping Identification

D. See Schedule -Surfaces to be Finished, at end of Section.

1.02. REFERENCES

A. ASME A 13.1 -Scheme for the Identification of Piping Systems; Latest Edition

B. ASTM 0 16 -Standard Terminology for Paint, Coatings, Materials, and Applications; 1998b.

C. ASTM 0 4442 -Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 1992 (Reapproved 1997).

D. NACE (IMP) -Industrial Maintenance Painting; NACE International; current edition.

E. SSPC (PM1) -Steel Structures Painting Manual, Vol. 1, Good Painting Practice; Society for Protective Coatings; 1993, Third Edition.

F. SSPC (PM2) -Steel Structures Painting Manual, Vol. 2, Systems and Specifications; Society for Protective Coatings; 1995, Seventh Edition.

1.03. SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products.

C. Samples for Color Selections: Submit manufacturer's standard color palette for Architect's selection.

D. Samples: Submit three painted samples, illustrating selected colors for each color and system selected with specified coats cascaded. Submit on heavy cardboard, 12x12 inch in size.

E. Submit three samples of sanded epoxy floor finish for owners' approval.

F. Manufacturer's Instructions: Indicate special surface preparation procedures.

G. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.04. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years' experience.

1.05. REGULATORY REQUIREMENTS

A. Conform to applicable code for flame, smoke and environmental requirements for products and finishes.

1.06. DELIVERY, STORAGE, AND PROTECTION

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.

1.07. ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.08. EXTRA MATERIALS

A. See Section 01 6000 - Product Requirements, for additional provisions.

B. Supply 1 gallon of each color; store where directed.

C. Label each container with color in addition to the manufacturer's label.

1.09. WARRANTY

A. Colors of all surfaces finished under this section shall, at the end of one year, have remained free from serious fading, and variations, if any, shall be uniform. All materials shall have their original adherence at the end of one year, and there shall be no evidence of blistering, running, peeling, scaling, chalking, streaks or stains at the end of this period. Washing with alkali-free soap and water shall remove surface dirt without producing any deteriorating effects.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Paints:
1. Frazee.
2. Glidden Professional.
3. Sherwin-Williams Co.
4. Dunn Edwards.

B. Substitutions: See Section 01 6000 -Product Requirements.

2.02. PAINTS AND COATINGS -GENERAL

A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
2. For good flow and brushing properties.
3. Capable of drying or curing free of streaks or sags.

2.03. PAINT SYSTEMS -EXTERIOR

A. Paint Type PE-1 -Masonry, Opaque, Latex, 3 Coat:
1. One coat of C302 UltraTech 100% Acrylic block filler.
2. Flat: Two coats 203 Duratec II 100% Acrylic Flat.

B. Paint Type PE-2 -Ferrous Metals, Unprimed, Alkyd, 3 Coat:
1. One coat of E-59 Universal Epoxy Ester primer.
2. Semi-gloss: Two coats 628 Aro-Plate Alkyd Semi-Gloss.

C. Paint Type PE-3 -Ferrous Metals, Primed, Alkyd, 2 Coat:
1. Touch-up with E-59 Universal Epoxy Ester Primer.
2. Semi-gloss: Two coats of 628 Aro-Plate Alkyd Semi-Gloss.

D. Paint Type PE-4 -Galvanized Metals, Alkyd, 3 Coat:
1. One coat of E-59 Universal Metal Primer.
2. Semi-gloss: Two coats 628 Aro-Plate Alkyd Semi-Gloss.

E. Paint PE-5 -Brick Masonry: Rainguard Microseal per ASTM E 514-90, 2 Coats

2.04. PAINT SYSTEMS -INTERIOR

A. Paint Type PI-1 -Concrete, Opaque, Alkyd, 3 Coat:
   1. One coat of 168 Prime plus Primer Sealer.
   2. Semi-gloss: Two coats of 628 Aro-Plate Alkyd Semi-gloss.

B. Paint Type PI-2 -Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of E-59 Universal Epoxy Ester primer.
   2. Semi-gloss: Two coats 628 Aro-Plate Alkyd Semi-Gloss.

C. Paint Type PI-3 -Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch up with E-59 Universal Epoxy Ester primer.
   2. Semi-gloss: Two coats 628 Aro-Plate Alkyd Semi-Gloss.

D. Paint Type PI-4 -Galvanized Metals, Alkyd, 3 Coat:
   1. One coat of E-59 Universal Epoxy Ester primer.
   2. Semi-gloss: Two coats 628 Aro-Plate Alkyd Semi-Gloss.

E. Paint Type PI-5 -Concrete, Epoxy Coating:
   1. Two coats of E-10 High Solids Epoxy Coating with broadcast sand.

F. Paint Type PI-6 -Gypsum Board, Alkyd, 3 Coat:
   1. One coat of 168 Prime Plus primer.
   2. Semi-gloss: Two coats 628 Aro-Plate Alkyd Semi-Gloss.

G. PaintType PI-7 -Gypsum Board, Latex, 3 Coat:
   1. One coat of C152 UltraTech Multi Solution Primer.
   2. Eggshell: Two coats of 022 LoGlo Eggshell Enamel.

H. Paint Type PI-8 –Fabrics / insulation Jackets, Acrylic, 2 Coat:
   1. One coat of C152 UltraTech Multi Solution Primer.
   2. Semi-gloss: One coat of 124 Mirro-Glide Acrylic Semi-Gloss.

I. Paint Type PI-9 – Masonry walls:
   1. One coat of C203 UltraTech 100% Acrylic Block Filler.
   2. Semi-Gloss: Two coats of 628 Aro-Plate Alkyd Semi-Gloss.

2.05. ACCESSORY MATERIALS

A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

D. Sand or walnut shells

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
   1. Plaster and Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Concrete Floors: 8 percent.

3.02. PREPARATION

A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Surfaces: Correct defects and clean surfaces which affect work of this section.

C. Marks: Seal with shellac those which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Concrete and Unit Masonry 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. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

G. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.

H. Concrete Floors to be Painted: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

J. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are Similarly cleaned. Prime paint entire surface; spot prime after repairs.

K. Shop-Primed Steel Surfaces to be Finish Painted: 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.

L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03. APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Broadcast sand or walnut shells into epoxy floor coating per manufacturers recommendations and upon approval of owner.

F. Vacuum clean surfaces loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

3.04. FINISHING PIPING SYSTEMS

A. Painting of Piping:

1. Paint medical gas piping in the stockpile prior to installation. Leave ends unpainted where they will be brazed or soldered.
2. After installation, touch up paint on exposed piping.
3. Color codes for medical gas piping:
   a. Medical compressed air: Yellow
   b. Oxygen: Green
   c. Nitrous Oxide: Medium blue
   d. Mechanical Piping:

4. Exposed or concealed, but accessible insulated and uninsulated mechanical piping Shall be painted in its entirety.
5. Color codes for mechanical piping:
    a. Chilled water: Pale green
    b. Condensed water. Blue-green
    c. Heating hot water: Pink
    d. Steam: Dark orange
    e. Steam condensate: Light orange
    f. Domestic cold water: Dark blue
    g. Domestic hot water: Rose red
    h. Natural gas: Magenta

3.05. CLEANING

A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06. SCHEDULE -SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:
    1. Items fully factory-finished unless specifically noted.
    2. Fire rating labels, equipment serial number and capacity labels.
    3. Stainless steel items.

B. Paint the surfaces described below under Schedule -Paint Systems.

C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
    1. Paint shop-primed items occurring in finished areas.
    2. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
    3. Paint dampers exposed behind louvers, grilles, to match face panels.

D. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

3.07. SCHEDULE -PAINT SYSTEMS

A. General: See FINISH SCHEDULE on drawings. See below for those items not listed in the schedule.

B. Concrete Block: Finish all surfaces exposed to view and parapet walls.
    1. Exterior: PE-1
    2. Interior: PI-9.

C. Brick Masonry: Finish all exposed surfaces.
    1. Exterior: PE-5

D. Steel Doors and Frames:
    1. Exterior Face: PE-3

E. Steel Fabrications: Finish all surfaces exposed to view.
    1. Primed:
        a. Exterior: PE-3
        b. Interior: PI-3
    2. Un-Primed:
        a. Exterior: PE-2
        b. Interior: PI-2

F. Galvanized Steel: Finish all surfaces exposed to view.
    a. Exterior: PE-4
    b. Interior: PI-4

G. Shop-Primed Metal Items: Finish all surfaces exposed to view.
   1. Finish the following items:
      a. Exposed surfaces of lintels.
      b. Pit ladders.
      c. Exposed surfaces of steel railings.
   2. Exterior: PE-3
   3. Interior: PI-3

3.08. FINISHED WORK

A. Finishes shall be free of cloudiness, spotting, laps, brush marks, runs, sags, or other surface imperfections.

B. Opaque finishes shall be clean, smooth and of uniform finish, color, appearance and coverage.

C. Transparent finishes shall be clean, glass-smooth and of even luster.

D. Other areas shall be free of debris and damage from work of this section.

END OF SECTION

SECTION 10 1400
SPECIALTY SIGNS

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division -1 Specification sections, apply to work specified in this section.

1.02. SECTION INCLUDES

A. Extent of specialty signs is as shown on the drawings

B. Forms of specialty signs required include the following:

1. Frame series – M202 x required length
2. Room designation series – MD3 – 2 1/2” x 5”
3. ADA regulatory symbol signs
4. CA Title 24 signs

1.03. SUBMITTAL

A. Manufacturers must submit 3 references showing products for projects completed within the last 6 years.

B. Submit manufacturer's technical data and installation for each type of sign required.

C. Submit shop drawings listing sign size, letter form and letter heights.

D. Submit one full size sample sign of type, style and color specified, including method of attachment. If approved, the sample will become part of the job.

1.04. SIGN TYPE DESCRIPTION

A. Signage shall consist of room number and room function to meet the requirements of the Americans with Disabilities Act - 1990 (ADA) and CABO ANSI Al 17.1 – 1992 and Title 24, Part 2, California Building Code (CBC 2013 Edition)

PART 2 - PRODUCTS

2.01. MANUFACTURER

A. Provide products from Mohawk Sign Systems, Inc.® P.O. Box 966, Schenectady, NY 12301-0966. 518/ 370-3433 or FAX 518/ 370-3332 or approved equal.

B. Substitutions: See Section 01 6000 -Product Requirements.

2.02. GRAPHIC PROCESS

A. All signs shall be manufactured using Graphic Process Series 200A - Sand Carved® using Format D.

1. Tactile characters shall be raised the required 1/32" inches from sign face. Glue-on letters or etched backgrounds are not acceptable.
2. All text shall be accompanied by Grade 2 braille. Braille shall be separated ½" from the corresponding raised characters or symbols. Grade 2 braille translation to be provided by signage manufacturer.
3. Perimeter borders shall be 3/8". (optional)
4. All letters, numbers and/or symbols shall contrast with their background, either light characters on a dark background or dark characters on a light background. Characters and background shall have a non-glare finish.

B. Plaque material shall be Special Purpose SP125 decorative thermosetting high-pressure laminate. Material to be 1/8” thick laminate with a melamine resin surface and a phenolic resin core which provides resistance to abrasion, stains, alcohol, solvents, boiling water, and heat. The material shall be NEMA rated and have flammability and smoke values that meet the standards for flammability of interior materials.

C. Background color as selected by architect from manufacturer's actual color samples.

D. Letterform shall be Gill Sans upper case letters and numbers

E. Size of letters and numbers shall be as follows:
   1. Room numbers shall be 1 ".
   2. Lettering for room ID signs shall be 3/4" or as noted.
   3. Symbol size shall be 4".
   4. Standard Grade 2 braille shall be ½" below copy.
   5. Corners: ½" radius

F. Copy position: CC (centered/centered) or as indicated on drawings.

2.03. SIGN DESIGN

Type A - Room ID signs with room number and function.

Type B - Room ID signs with room function only on one or two lines of copy.

Type C - ADA-compliant restroom signs with the verbal description and Grade 2 braille.

Type D – California Title 24 compliant sign

2.04. EXTERIOR WALL SIGNS (At Handicapped Entrances)

Type E - Accessible entrance symbol sign, insert size 9" x 9". Insert shall have a raised 4" accessibility symbol with the verbal description, "Entrance" using 1" Gill Sans upper case letters directly below and followed by Grade 2 braille.

See sign layouts on architectural drawings along with sign schedule.

PART 3 - EXECUTION

3.01. INSTALLATION

A. Signs shall be mounted using vinyl tape and silastic adhesive.

B. Mechanical for sign Type E.

C. All signs shall be mounted 60" from the floor to the center of the sign on the latch side. The distance between the door frame and sign should be 2".

D. Installer user assumes responsibility for suitable installation of the signs.

3.02. CLEANING AND PROTECTION

A. After installation, clean soiled signs surface according to manufacturer's instructions. Protect from damage until acceptance

END OF SECTION

SECTION 10 2113
TOILET PARTITIONS

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. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.
   2. Painted steel toilet compartments configured as toilet enclosures and urinal screens.

B. Related Requirements:
   1. Section 05 5000 "Metal Fabrications" for supports that attach floor-and-ceiling-anchored compartments to overhead structural system.
   2. Section 06 1053 "Miscellaneous Rough Carpentry" for blocking.
   3. Section 10 2800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.03. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3300 "Submittal Procedures."

B. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

C. Shop Drawings: For toilet compartments.
   1. Include plans, elevations, sections, details, and attachment details.
   2. Show locations of cutouts for compartment-mounted toilet accessories.
   3. Show locations of centerlines of toilet fixtures.
   4. Show locations of floor drains.
   5. Show ceiling grid, ceiling-mounted items, and overhead support or bracing locations.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
   1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch- square Samples of same thickness and material indicated for Work.
   2. Each type of hardware and accessory.

1.04. INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of toilet compartment.

1.05. CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.06. PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.01. PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the 2010 ADA Standards and CBC 11B for toilet compartments designated as accessible.

2.02. SOLID-PLASTIC TOILET COMPARTMENTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Accurate Partitions Corporation.
2. Bradley Corporation; Mills Partitions.
3. Partition Systems Incorporated of South Carolina; Columbia Partitions.

B. Toilet-Enclosure Style: Overhead braced.

C. Urinal-Screen Style: Wall hung.

D. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.

1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.

E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.

F. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

G. Overhead Cross Bracing for Ceiling-Hung Units: As recommended by manufacturer and fabricated from solid polymer.

2.03. PAINTED STEEL TOILET COMPARTMENTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide ASI Accurate Partitions or comparable product by one of the following:

1. Ampco by AJW.
2. [ASI Accurate Partitions, an ASI Group company.]
3. [ASI Global Partitions, an ASI Group company.]
4. Marlite.
5. Shanahan's Manufacturing Limited.

B. Toilet-Enclosure Style: Floor anchored.

C. Urinal-Screen Style: Wall hung.

D. Door Width: As indicated on Drawings] <Insert width>.

E. Door Panel Height: 64 inches (1626 mm).

F. Door Height Above Floor: 12 inches (305 mm).

G. Pilaster Height: 64 inches (2032 mm).

H. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Provide doors with integral no-sightline system including profile on strike and hinge side that overlaps adjacent pilaster. Exposed surfaces to be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) for doors and panels and 1-1/4 inches (32 mm) for pilasters.
2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand applied downward load on grab bar of at least 250 lbf (1112 N), when tested in accordance with ASTM F446, without deformation of panel.

I. Urinal-Screen Construction:
1. Flat-Panel Urinal Screen: Matching panel construction.

J. Facing Sheets and Closures: Electrolytically coated steel sheet with nominal base-metal (uncoated) thicknesses as follows:
1. Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 0.036 inch (0.91 mm).
2. Pilasters, Unbraced at One End: Manufacturer's standard thickness, but not less than 0.048 inch (1.21 mm).
3. Panels: Manufacturer's standard thickness, but not less than 0.030 inch (0.76 mm.
4. Doors: Manufacturer's standard thickness, but not less than 0.030 inch (0.76 mm).
5. Flat-Panel Urinal Screens: Thickness matching the panels.

K. Pilaster Shoes: Stainless steel sheet, not less than 0.031-inch (0.79-mm) nominal thickness and 3 inches (76 mm) high, No. 4 satin finish. Shoe bottom enclosed and integral to compartment structure. Secure to floor with manufacturer's recommended concrete anchors.

L. Panel or Pilaster Pedestal Legs: Stainless steel and minimum 4 inches (102 mm) high. Pedestal legs adjustable in height to within 1 inch (25 mm). Secure to floor with 2-1/2-inch- (64 mm-) long, corrosion-resistant screws.

M. Brackets (Fittings):
1. Stirrup Type: Ear or U-brackets; stainless steel.
2. Continuous Type: Manufacturer's standard design; stainless steel.

N. Steel Sheet Finish: Immediately after cleaning, apply manufacturer's standard baked-on thermosetting, electrostatically applied powder coatings. Comply with coating manufacturer's written instructions for applying and baking.
1. Color: As selected by Owner / Architect from manufacturer's full range

2.04. HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.
1. Hinges: Manufacturer's minimum 0.062-inch- thick stainless-steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through-bolts.
2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless-steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless-steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless-steel bumper at out-swinging doors. Mount with through-bolts.
5. Door Pull: Manufacturer's heavy-duty cast-stainless-steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.

2.05. MATERIALS

A. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

B. Stainless-Steel Castings: ASTM A 743/A 743M.

2.06. FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- wide, in-swinging doors for standard toilet compartments and 36-inch- wide, out-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:
   a. Pilasters and Panels: 1/2 inch.
   b. Panels and Walls: 1 inch.

B. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.

   a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
   b. Align brackets at pilasters with brackets at walls.

C. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

D. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.03. ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 10 2233
WIRE MESH PARTITIONS

PART 1 - GENERAL

1.01. SUMMARY

A. Section Includes:
   1. Standard-duty wire mesh partitions.
   2. Heavy-duty wire mesh partitions.
   3. Wire mesh ceilings.
   4. Wire mesh equipment physical barriers.

1.02. DEFINITIONS

A. Intermediate Crimp: Wires pass over one and under the next adjacent wire in both directions, with wires crimped before weaving and with extra crimps between the intersections.

B. Welded Wire: Wires are welded at every intersection, securely locking wires in place.

C. Lock Crimp: Deep crimps at points of the intersection that lock wires securely in place.

1.03. ACTION SUBMITTALS

A. Product Data:
   1. Wire mesh partitions

B. Shop Drawings:
   1. Include plans, elevations, sections, and attachment details.
   2. Indicate clearances required for operation of doors.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for units with factory-applied color finishes.

D. Samples for Verification: Panel constructed of specified frame members and wire mesh. Show method of finishing members at intersections.
   1. Size: 12 by 12 inches.

E. Delegated Design Submittal: For wire mesh partitions indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

1.04. INFORMATIONAL SUBMITTALS

A. Certificates:
   1. Welding certificates.

B. Qualification Data:
   1. Installer
   2. Delegated Design Engineer.

1.05. CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wire mesh partition hardware.

1.06. QUALITY ASSURANCE

A. Qualifications:
   1. Installer.
   2. Welding: Qualify procedures and personnel in accordance with the following welding codes:

a. AWS D1.1/D1.1M.
b. AWS D1.3/D1.3M.

3. Delegated Design Engineer: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

1.07. DELIVERY, STORAGE, AND HANDLING

A. Deliver wire mesh items palleted to provide protection during transit and Project-site storage. Use vented plastic.

B. Inventory wire mesh partition door hardware on receipt and provide secure lockup for wire mesh partition door hardware delivered to Project site.

C. Tag each item or package separately with identification and include basic installation instructions with each item or package.

D. Deliver keys to Owner.

1.08. FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with wire mesh units by field measurements before fabrication.

PART 2 - PRODUCTS

2.01. SOURCE LIMITATIONS

A. For wire mesh products, obtain each color, grade, finish, type, and variety from single source with resources to provide products of consistent quality in appearance and physical properties.

2.02. MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide WireCrafters, LLC; Welded Wire Mesh Partition System or comparable product by one of the following:

1. Acorn Wire & Iron Works.
2. Central Wire and Iron.
3. Miller Wire Works, Inc.

B. Substitutions: See Section 01 6000 -Product Requirements.

2.03. PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design wire mesh units.

B. Structural Performance: Wire mesh units to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m) at any location on a panel.
2. Total load of [200 lbf (0.89 kN)] <Insert value> applied uniformly over each panel.
3. Concentrated load and total load need not be assumed to act concurrently.

C. Seismic Performance: Wire mesh units to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

D. Regulatory Requirements: Comply with applicable provisions in 2019 CBC part 2 chapter 10 for doors designated as accessible.

2.04. STANDARD-DUTY WIRE MESH PARTITIONS

A. Partition Height: 8 ft. 5-1/4 inches (2.57 m).

B. Welded Wire Mesh: 10 gauge, 0.135-inch- (3.5-mm-) diameter wire, 2-by-2-inch (50-by-50-mm) square mesh.

C. Vertical and Horizontal Panel Framing: 1-1/4-by-1-1/4-by-1/8-inch (32-by-32-by-3-mm) L-shaped steel angles.

D. Line and Corner Posts: 14 gauge, 0.075-inch- (1.9-mm-) thick, 2-by-2-inch (50-by-50-mm) steel square tubes with holes for 3/8-inch- (10-mm-) diameter bolts aligning with bolt holes in vertical framing; with welded base plates.

E. Swinging Doors: Fabricated from same mesh as partitions, with framing fabricated from 1-1/4-by-1-1/4-by-1/8-inch (32-by-32-by-3-mm) L-shaped steel angles, banded with two horizontal and one vertical 3/4-by-1/4-inch (19-by-6-mm) flat steel bar stiffeners.

1. Hinges: Full-surface type, 10 gauge, 0.135-inch (3.5-mm) thick, 4-by-4-inch (102-by-102-mm) steel, three per door; bolted to door and jamb framing.
2. Padlock Lug.
3. Cylinder Lock: Mortise type with interchangeable core cylinder, keying to be specified by owner; operated by key outside and lever inside.

F. Accessories:

1. Sheet Metal Panels: 16 gauge, 0.060-inch- (1.5-mm-) thick, steel sheet.
2. Adjustable Filler Panels: 16 gauge, 0.060-inch- (1.5-mm-) thick, steel sheet; capable of filling openings from 1 to 11 inches (50 to 300 mm).
3. Wall Clips: Manufacturer's standard, steel sheet.

G. Finish: Powder-coated finish unless otherwise indicated.

2.05. MATERIALS

A. Steel Wire: ASTM A510/A510M.

B. Steel Plates, Channels, Angles, and Bars: ASTM A36/A36M.

C. Steel Sheet: Cold-rolled steel sheet, ASTM A1008/A1008M, Commercial Steel (CS), Type B.

D. Steel Pipe: ASTM A53/A53M, Schedule 40, unless another weight is indicated or required by structural loads.

E. Steel Tubing: ASTM A500/A500M, cold-formed structural-steel tubing or ASTM A513/A513M, Type 5, mandrel-drawn mechanical tubing.

F. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with G60 (Z180) zinc (galvanized) coating designation.

G. Panel-to-Panel Fasteners: Manufacturer's standard steel bolts, nuts, and washers.

H. Post-Installed Anchors: Capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

1. Material: Carbon-steel components are zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

I. Power-Driven Fasteners: ICC-ES AC70.

J. Seismic Bracing: Angles with legs not less than 1-1/4 inches (32 mm) wide, formed from 0.040-inch- (1.0-mm-) thick, metallic-coated steel sheet; with bolted connections and 1/4-inch- (6-mm-) diameter bolts.

2.06. FABRICATION

A. General: Fabricate wire mesh items from components of sizes not less than those indicated. Use larger-sized components as recommended by wire mesh item manufacturer. Furnish bolts, hardware, and accessories required for complete installation with manufacturer's standard finishes.

1. Welding: Weld corner joints of framing and grind smooth, leaving no evidence of joint.

B. Standard-Duty Wire Mesh Partitions: Fabricate wire mesh partitions with cutouts for pipes, ducts, beams, and other items indicated. Finish edges of cutouts to provide a neat, protective edge.

1. Mesh: Weld mesh to framing.
2. Framing: Fabricate framing with mortise-and-tenon corner construction.

a. Provide horizontal stiffeners as indicated or, if not indicated, as required by panel height and as recommended by wire mesh partition manufacturer. Weld horizontal stiffeners to vertical framing.
b. Fabricate three- and four-way intersections using intersection posts.
c. Fabricate partition and door framing with slotted holes for connecting adjacent panels.

3. Fabricate wire mesh partitions with bottom horizontal framing flush with finished floor.
4. Doors: Align bottom of door with bottom of adjacent panels.
   a. For doors that do not extend full height of partition, provide transom over door, fabricated from same mesh and framing as partition panels.

2.07. STEEL AND IRON FINISHES

A. Powder-Coated Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on powder-coat finish, suitable for use indicated, with a minimum dry film thickness of [2 mils (0.05 mm)] <Insert dimension>.
   1. Color: As selected by Owner / Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine floors for suitable conditions where wire mesh items will be installed.

C. Examine walls to which wire mesh items will be attached for properly located blocking, grounds, and other solid backing for attachment of support fasteners.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. INSTALLATION OF WIRE MESH PARTITIONS

A. Anchor wire mesh partitions to floor with 3/8-inch-diameter, post installed expansion anchors through base plates located at each post and corner.

B. Anchor wire mesh partitions to walls through back corner panel framing and as follows:
   1. For concrete and solid masonry anchorage, use expansion anchors.

C. Provide line posts at locations indicated or, if not indicated, as follows:
   1. On each side of door openings.
   2. Maximum of 5 ft. (3.05 m) apart, regardless of height.

D. Provide seismic supports and bracing as indicated or, if not indicated, as recommended by manufacturer and as required for stability, extending and fastening members to supporting structure.

E. Where standard-width wire mesh partition panels do not fill entire length of run, provide adjustable filler panels to fill openings.

F. Install doors complete with door hardware.

G. Install service windows complete with window hardware.

H. Bolt accessories to wire mesh partition framing.

3.03. REPAIR

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

3.04. ADJUSTING

A. Adjust doors to operate smoothly and easily, without binding or warping. Adjust hardware to function smoothly. Verify that latches and locks engage accurately and securely without forcing or binding.

3.05. PROTECTION

A. Remove and replace defective work, including doors and framing that are warped, bowed, or otherwise unacceptable.

END OF SECTION

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SECTION 10 2600
WALL AND DOOR PROTECTION

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. Corner guards.
   2. Impact-resistant wall coverings.

B. Related Sections:
   1. Section 08 7100 "Hardware" for metal armor, kick, mop, and push plates.

1.03. PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide handrails capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Uniform load of 50 lbf/ft. applied in any direction.
   2. Concentrated load of 200 lbf applied in any direction.
   3. Uniform and concentrated loads need not be assumed to act concurrently.

1.04. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3000 "Administrative Requirements."

B. Product Data: Include construction details, material descriptions, impact strength, fire-test-response characteristics, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

C. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.
   1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
   1. Impact-Resistant Wall Covering: 6 by 6 inches square.
   2. Door-Surface Protection: 6 by 6 inches square.

1.05. CLOSEOUT SUBMITTALS

A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.
   1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

1.06. QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Section 01 4000 "Quality Requirements."
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for

D. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

E. Regulatory Requirements: Comply with applicable provisions in the 2010 ADA Standards and CBC 11B.

F. Preinstallation Conference: Conduct conference at Project site.

G. Provide the following upon request:
   1. Qualification Data: For qualified Installer.
   2. Material Certificates: For each impact-resistant plastic material, from manufacturer.
   3. Material Test Reports: For each impact-resistant plastic material.

1.07. DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
   1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
   2. Keep plastic sheet material out of direct sunlight.
   3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
      a. Store corner-guard covers in a vertical position.
      b. Store covers in a horizontal position.

1.08. PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.09. WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures.
      b. Deterioration of plastic and other materials beyond normal use.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01. MATERIALS

A. PVC Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; extruded and sheet material, thickness as indicated.
   1. Impact Resistance: Minimum 25.4 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
   2. Chemical and Stain Resistance: Tested according to ASTM D 543.
   3. Self-extinguishing when tested according to ASTM D 635.
   4. Flame-Spread Index: 25 or less.

5. Smoke-Developed Index: 450 or less.

B. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated, but with not less than strength and durability properties specified in ASTM B 221 for Alloy 6063-T5.

C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

D. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.02. CORNER GUARDS

A. Surface-Mounted, Resilient, Plastic Corner Guards: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Arden Architectural Specialties, Inc.
   b. Construction Specialties, Inc.
   c. IPC Door and Wall Protection Systems; Division of InPro Corporation.
2. Cover: Extruded rigid plastic, minimum 0.100-inch wall thickness; in dimensions and profiles indicated on Drawings.
   a. Color and Texture: As selected by Architect from manufacturer's full range.
3. Retainer: Minimum 0.060-inch- thick, one-piece, extruded aluminum.
4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.03. IMPACT-RESISTANT WALL COVERINGS

A. Impact-Resistant Sheet Wall Covering Insert drawing designation: Fabricated from plastic sheet wall-covering material.

1. 1. Sheet Thickness: 0.040 inch.
2. 2. Color and Texture: As indicated by manufacturer's designations.
3. 3. Height: As indicated.
4. 4. Trim and Joint Moldings: Extruded rigid plastic that matches sheet wall covering color.
5. 5. Mounting: Adhesive.

2.04. FABRICATION

A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.05. METAL FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Remove tool and die marks and stretch lines, or blend into finish.
2. Grind and polish surfaces to produce uniform finish, free of cross scratches.
3. Run grain of directional finishes with long dimension of each piece.

4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. PREPARATION

A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.03. INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.
    a. Provide anchoring devices to withstand imposed loads.
    b. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches.
    c. Adjust end and top caps as required to ensure tight seams.

B. Impact-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.04. CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 10 265
WALL SURFACE PROTECTION SYSTEM

PART 1 - GENERAL

1.01. RELATED DOCUMENTS

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

1.02. SUMMARY

A. This Section includes the following types of wall surface protection systems:
   1. Rigid sheet wall covering panels.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1.03. SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each wall surface protection system component and installation accessory required, including installation methods for each type of substrate. Provide written data on each required component including physical characteristics, such as durability, resistance to fading, and flame resistance.

C. Shop drawings showing locations, extent, and installation details. Show methods of attachment to adjoining construction.

D. Samples for Initial Selection: For initial selection of color, pattern and surface texture, provide the manufacturer's standard color chips consisting of actual sections of each vinyl plastic material required showing the full range of materials, colors, and textures available.

E. Samples for Verification Purposes: Submit the following samples, prepared from the same material to be used in the Work, for verification of color, pattern, and texture selected and for compliance with requirements indicated:
   1. 6-inch by 6-inch square (minimum size) samples of each rigid sheet or panel type wall surface protection material required.

F. Maintenance data for wall surface protection system components for inclusion in the Operating and Maintenance Manuals specified in Division 1.

1.04. QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has previously installed wall surface protection systems similar in material, design, and extent to the systems indicated for this Project.

B. Manufacturer Qualifications: Firm experienced in manufacturing wall surface protection system components that are similar to those required for this Project and that have a record of successful in-service performance.

C. Fire Performance Characteristics: Provide wall surface protection system components that are identical to those tested in accordance with ASTM E 84 for the fire performance characteristics indicated below. Identify wall surface protection system components with appropriate markings from the testing and inspection organization.
   1. Flame Spread: 25 or less.
   2. Smoke Developed: 450 or less.

D. Impact Strength: Provide wall surface protection system components with a minimum impact resistance of 25.4 ft. lbs. per sq. ft. when tested in accordance with ASTM D 256 (Izod impact, ft. lbs. per inch notch).

E. Single Source Responsibility: Obtain each color, grade, finish, and type of wall surface protection system component from a single source with resources to provided products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.05. DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, and fire hazard classification.

B. Store wall surface protection materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within the storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored. Keep sheet material out of direct sunlight to avoid surface distortion.
2. Store rigid plastic wall guard in a horizontal position for a minimum of 72 hours, or until the plastic material attains the minimum room temperature of 70 deg F (21 deg C).

1.06. PROJECT CONDITIONS

A. Environmental Conditions: Do not install wall surface protection system components until the space is enclosed and weatherproof and until the ambient temperature within the building is maintained at not less than 70 deg F (21 deg C) for not less than 72 hours prior to beginning of the installation. Do not install rigid plastic wall surface protection systems until that temperature has been attained and is stabilized.

1.07. MAINTENANCE

A. Maintenance Instructions: Provide the manufacturer's instructions for maintenance of installed work. Include recommended methods and frequency for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against cleaning materials and methods that may be detrimental to finishes and performance.

B. Replacement Materials: After completion of work, deliver not less than 2 percent of each type, color, and pattern of wall surface protection material. Replacement materials shall be from the same production run as materials installed. Package replacement materials with protective covering, identified with appropriate labels.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products for wall surface protection which may be incorporated into the Work include, but are not limited to, the following:

1. Construction specialties, Inc.
2. InPro Corporation
3. Koroseal Wallcoverings

2.02. MATERIALS

A. Plastic Sheet Wall Covering Material: Textured, chemical- and stain-resistant, high-impact, polyvinyl chloride (PVC) or acrylic modified vinyl plastic sheets, thickness as indicated. Comply with specified requirements of ASTM D 256 for impact resistance and ASTM E 84 for flame spread and smoke developed characteristics.

1. Colors and Textures of Plastic Material: Provide extruded plastic material that matches selections made by the Architect from the manufacturer's full range of standard colors and textures.

B. Accessories: Provide top caps, inside corner, divider bars and outside corners from extruded PVC and as recommended by the manufacturer.

2.03. IMPACT-RESISTANT WALL COVERINGS

A. Semi-rigid Sheet Wall Covering: Provide manufacturer's standard semirigid, embossed, fiber-backed, impact-resistant plastic sheets. Sheets shall comply with fire performance characteristics specified and be chemical- and stain-resistant. Provide manufacturer's standard matching moldings and trim as required.

1. Sheet Size: 4 feet by 8 feet.
2. Sheet Thickness: 0.06 inch thick (minimum.)

3. Trim: Provide manufacturer's standard matching moldings and trim as required.

B. Color Matched Caulk: Manufacturer's standard

C. Adhesive and Primer: As recommended by manufacturer.

2.04. FABRICATION

A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thicknesses of components.

B. Provide surfaces free of evidence of wrinkling, chipping, uneven coloration, dents, and other imperfections.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine areas and conditions in which wall protection systems will be installed.

1. Complete all finishing operations, including painting, before beginning installation of wall surface protection system materials.

B. Impact-Resistant Wall Covering Materials: Wall surfaces to receive impact-resistant wall covering materials shall be dry and free from dirt, grease, loose paint, and scale.

C. Do not proceed with installations until unsatisfactory conditions have been corrected.

3.02. PREPARATION

A. General: Prior to installation, clean substrate to remove dust, debris, and loose particles.

3.03. INSTALLATION

A. General: Install wall surface protection units plumb, level, and true to line without distortions.

1. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished work.

3.04. CLEANING

A. General: Immediately upon completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent. Clean metal components in accordance with the manufacturer's recommendations.

B. Remove excess adhesive using methods and materials recommended by manufacturer.

C. Remove surplus materials, rubbish, and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

END OF SECTION

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SECTION 10 2813
TOILET ACCESSORIES

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Accessories for toilet rooms.

B. Public-use washroom accessories.

C. Healthcare accessories.

D. Childcare accessories.

E. Underlavatory guards.

F. Custodial accessories.

1.02. REFERENCES

A. ASTM A 123/A 123M -Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron. and Steel Products; 1997a.

B. ASTM A 269 -Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 1998.

C. ASTM A 653/A 653M -Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 1999a.

D. ASTM A 666 -Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1999.

E. ASTM B 456 -Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 1995.

F. ASTM C 1036 -Standard Specification for Flat Glass; 1991 (Reapproved 1997).

G. GSA CID A-A-3002 -Mirrors, Glass; U.S. General Services Administration; 1996.

1.03. COORDINATION

A. 1.3

B. Coordinate accessory locations with other work to prevent interference with clearances required for access

C. A.

D. by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of

E. accessories.

F. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the

G. B.

H. Work.

1.04. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3300 "Submittal Procedures."

B. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

3. Include electrical characteristics.

C. Samples: Full size, for each exposed product and for each finish specified.
1. Approved full-size Samples will be returned and may be used in the Work.

D. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.05. CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.06. WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Products listed are made by Bobrick Washroom Equipment, Inc.

B. Other Acceptable Manufacturers:
1. American Specialties, Inc.
2. Substitutions: Section 01 6000 - Product Requirements.

C. All items of each type to be made by the same manufacturer.

2.02. PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Toilet Tissue (Roll) Dispenser :
1. Description: Double-roll dispenser.
2. Mounting: Surface mounted.
3. Operation: Noncontrol delivery with standard spindle.
4. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Combination Towel (Folded) Dispenser/Waste Receptacle :
1. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.
2. Mounting: Recessed with projecting receptacle.
3. Minimum Towel-Dispenser Capacity: 600 C-fold or 800 multifold paper towels.
4. Minimum Waste-Receptacle Capacity: 12 gal..
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Liner: Reusable, vinyl waste-receptacle liner.
7. Lockset: Tumbler type for towel-dispenser compartment.

D. Liquid-Soap Dispenser :
1. Description: Designed for dispensing soap in liquid or lotion form.
2. Mounting: Horizontally oriented, surface mounted.
3. Refill Indicator: Window type.

E. Grab Bar :
1. Mounting: Flanges with concealed fasteners.

2. Material: Stainless steel, 0.05 inch thick.
   a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
3. Outside Diameter: 1-1/2 inches.
4. Configuration and Length: As indicated on Drawings.

F. Vendor :
1. Type: Sanitary napkin and tampon.
2. Mounting: Surface mounted.
3. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
4. Lockset: Tumbler type with separate lock and key for coin box.

G. Sanitary-Napkin Disposal Unit :
1. Mounting: Surface mounted.
2. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
3. Receptacle: Removable.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

H. Seat-Cover Dispenser :
1. Mounting: .
2. Minimum Capacity: 250 seat covers.
3. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
4. Lockset: Tumbler type.

I. Mirror Unit :
1. Frame: Stainless-steel channel .
   a. Corners: Welded and ground smooth.
2. Integral Shelf: 5 inches deep.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
   a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
4. Size: As indicated on Drawings.

J. Coat Hook :
1. Description: Double -prong unit.
2. Material and Finish: Stainless steel, No. 4 finish (satin).

2.03. CHILDCARE ACCESSORIES

A. Source Limitations: Obtain childcare accessories from single source from single manufacturer.

B. Diaper-Changing Station :
1. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
   a. Manufacturer: Koala Kare Products, a division of Bobrick Centenial
   b. Model: Horizontal Wall Mount Stainless Steel, KB110-SSWM
   c. Engineered to support minimum of 250-lb static load when opened.
2. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
3. Operation: By pneumatic shock-absorbing mechanism.
4. Liner Dispenser: Built in.

2.04. UNDERLAVATORY GUARDS

A. Underlavatory Guard

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

2.05. CUSTODIAL ACCESSORIES

A. Mop and Broom Holder :
1. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
2. Length: 36 inches.
3. Hooks: Four.
4. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
   a. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
   b. Rod: Approximately 1/4-inch- diameter stainless steel.

2.06. MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

F. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.07. FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.02. PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03. INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated Install plumb and level, securely and rigidly anchored to substrate.

B. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

C. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.04. ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions

END OF SECTION

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SECTION 10 4413
FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Fire extinguishers.

1.02. REFERENCES

A. UL (FPED) -Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.03. PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10 and Title 19 of the California Code of Regulation.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.04. SUBMITTALS

A. See Section 01 3000 -Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher operational features.

C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

D. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05. ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Fire Extinguishers, and Accessories:

1. JL Industries, Inc.
2. Larsen's Manufacturing Co.
3. Potter-Roemer.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.02. FIRE EXTINGUISHERS

A. Fire extinguishers shall comply with requirements of governing authorities and manufacturer's requirement.

B. Size and classification as indicated.

2.03. MOUNTING BRACKETS:

A. Provide manufacturer's standard bracket designed to prevent accidental dislodgement of extinguisher, of proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verify existing conditions before starting work.

3.02. INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install brackets for a level and plumb extinguisher and locate so that top of extinguisher will be 48 inches above finished floor.

C. Secure rigidly in place.

D. Place extinguishers on wall brackets.

END OF SECTION

SECTION 11 5213
PROJECTION SCREENS

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. Electrically operated, front-projection screens and controls.

B. Related Requirements:
   1. Section 05 5000 "Metal Fabrications" for metal support framing for front-projection screens.
   2. Section 06 1053 "Miscellaneous Rough Carpentry" for wood backing for screen installation.

1.03. DEFINITIONS

A. Gain: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.

B. Half-Gain Angle: The angle, measured from the axis of the screen surface to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.04. ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Product Data submittal and Samples submittal. Ensure compliance with requirements included in Section 01 3300 "Submittal Procedures."

B. Product Data: For each type of product.

C. Shop Drawings: Show layouts and types of front-projection screens. Include the following:
   1. Drop lengths.
   2. Location of seams in viewing surfaces.
   3. Location of screen centerline relative to ends of screen case.
   4. Anchorage details, including connection to supporting structure for suspended units.
   5. Details of juncture of exposed surfaces with adjacent finishes.
   6. Location of wiring connections for electrically operated units.
   7. Wiring diagrams for electrically operated units.
   8. Accessories.

D. Samples for Initial Selection: For finishes of surface-mounted screen cases.

1.05. CLOSEOUT SUBMITTALS

A. Maintenance Data: For front-projection screens to include in maintenance manuals.

1.06. DELIVERY, STORAGE, AND HANDLING

A. Environmental Limitations: Do not deliver or install front-projection screens until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.07. COORDINATION

A. Coordinate layout and installation of front-projection screens with adjacent construction, including ceiling suspension systems, light fixtures, HVAC equipment, fire-suppression system, and partitions.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Source Limitations for Projection Screens: Obtain front-projection screens from single manufacturer. Obtain accessories, including necessary mounting hardware, from screen manufacturer.

B. Draper, Inc

C. Substitutions: See Section 01 6000 -Product Requirements.

2.02. ELECTRICALLY OPERATED, FRONT-PROJECTION SCREENS

A. Suspended, Electrically Operated Screens with Automatic Ceiling Closure, with Motor-in-Roller, and without Tab Tensioning: Units designed and fabricated for suspended mounting; with bottom of case composed of two panels, fully enclosing screen, motor, and wiring; one panel hinged and designed to open and close automatically when screen is lowered and fully raised, the other removable or openable for access to interior of case.

1. Provide metal or metal-lined wiring compartment.
2. Screen Case: Made from metal.
3. Provide screen case constructed to be installed with underside flush with ceiling.
4. Finish on Exposed Surfaces: Prime painted.

2.03. FRONT-PROJECTION SCREEN MATERIAL

A. Wide-Angle Reflective Viewing Surface: Peak gain of not less than 1.5, and half-gain angle of at least 35 degrees from the axis of the screen surface.

B. Material: Vinyl-coated, glass-fiber fabric.

C. Mildew-Resistance Rating: Zero or 1 when tested according to ASTM G 21.

D. Flame Resistance: Passes NFPA 701.

E. Flame-Spread Index: Not greater than 75 when tested according to ASTM E 84.

F. Seamless Construction: Provide screens, in sizes indicated, without seams.

G. Edge Treatment: Black masking borders.

H. Provide extra drop length of dimensions and at locations indicated.

1. Color: Black.

PART 3 - EXECUTION

3.01. INSTALLATION

A. Install front-projection screens at locations indicated to comply with screen manufacturer's written instructions.

B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.

1. Install low-voltage controls according to NFPA 70 and complying with manufacturer's written instructions.
   a. Wiring Method: Install wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.
2. Test electrically operated units to verify that screen controls, limit switches, closures, and other operating components are in optimum functioning condition.

END OF SECTION

SECTION 12 9313
BIKE RACKS

PART 1 - GENERAL

1.01. SECTION INCLUDES

A. Bicycle racks of the following types:
   1. Ultra Space Saver.

1.02. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03. SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's product literature and technical data, including physical characteristics such as shape, dimensions, bicycle parking capacity, and finish for each product.

C. Shop Drawings; Show installation details for each product.

D. Maintenance Data: For each bicycle rack. Include recommended methods for repairing damage to the finish

1.04. QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 2 years manufacturing similar products.

B. Installer Qualifications: An experienced installer who has completed installation of products similar in material, design, and extent to that indicated for this project.

C. Source Limitations: Obtain each color, finish, shape and type of product from a single source with resources to provide components of consistent quality in appearance and physical properties.

1.05. DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's recommendations.

B. Store products in original undamaged packages and containers until ready for installation.

1.06. PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.07. WARRANTY

A. Provide manufacturer's standard limited warranty against defects in materials and workmanship.

PART 2 - PRODUCTS

2.01. MANUFACTURERS

A. Acceptable Manufacturer: Dero Bike Rack Co.

B. Substitutions: See Section 01 6000 -Product Requirements.

2.02. BICYCLE RACKS

A. Ultra Space Saver Rack: Modular system, one bike per hanger.
   1. Single Sided:
   2. Hanger: 1 inch O.D. 11 gauge tube with 1/2 inch steel round bar.
   3. Upright: 2 x 2 x 11 gauge inch square tube.
   4. Feet: AISI C3 x 4.1 galvanized steel chan.

5. Crossbeams: 1-1/4 inch schedule 40 galvanized pipe, 1.66 inch O.D.
6. Spacers: 2-3/8 inch O.D. plastic tubes with .218 inch wall thickness.
7. Mounting: Wall-mounted.
8. Finish: Powder coated.
   a. Epoxy primer.
   b. UV resistant polyester powder coat.
   c. Minimum thickness: 6 mils.
9. Color: To be selected by Owner / Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01. EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions that may be detrimental to proper or timely completion.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.02. INSTALLATION

A. Install products in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   1. Comply with manufacturer's published minimum setback dimensions and recommended mounting heights.

3.03. CLEANING AND PROTECTION

A. Protect from damage during construction operations. Promptly repair any damaged surfaces. Remove and replace work which cannot be satisfactorily repaired.

END OF SECTION

SECTION 20 0100
GENERAL MECHANICAL PROVISIONS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The preceding General Conditions shall form a part of this Section with the same force and effect as though repeated here. The provisions of this Section shall also apply to the following Divisions 22, 23 and 25 of these Specifications and shall be considered a part of those Divisions.

1.2 CODES AND REGULATIONS

A. All work and materials shall be in accordance with current rules and regulations of applicable codes. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to these codes. Should the Drawings or Specifications call for material or methods of construction of a higher quality or standard than required by these codes, the Drawings and Specifications shall govern. Applicable codes and regulations include, but are not necessarily limited to, the following:

California Building Code	CCR Title 24, Part 2
California Electrical Code	CCR Title 24, Part 3
California Mechanical Code	CCR Title 24, Part 4
California Plumbing Code	CCR Title 24, Part 5
California Energy Code	CCR Title 24, Part 6
California Fire Code	CCR Title 24, Part 9
Local Codes	

1.3 DEFINITIONS

A. Provide: The term "provide" as used in these specifications or on the drawings shall mean furnish and install.

B. Piping: The term "piping" as used in these specifications or on the drawings shall mean all pipe, fittings, valves, hangers, insulation, etc. as may be required for a complete and functional system.

C. Ductwork: The terms "duct" or "ductwork" as used in these specifications or on the drawings shall mean all ducts, fittings, joints, dampers, hangers, insulation, etc. as may be required for a complete and functional system.

D. Wiring: The term "wiring" as used in these specifications or on the drawings shall mean all wiring, conduit, boxes, connections, transformers, relays, switches etc. as may be required for a complete and functional system.

1.4 PERMITS AND FEES

A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required. All charges are to be included in the work.

1.5 COORDINATION OF WORK

A. Examination: Before starting work, thoroughly examine existing and newly completed underlying and adjoining work and conditions on which the installation of this work depends. Report to the Engineer in writing all conditions which might adversely affect this work.

B. Layout: Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. Some work may be shown offset for clarity. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc. shall be carefully planned prior to installation of any work in order to avoid all interference with each other, or with structural, electrical, architectural or other elements.

C. Verification: If discrepancies are discovered between drawing and specification requirements, the more stringent requirement shall apply. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment. No work shall be prefabricated or installed prior to this coordination. No costs will be allowed to the Contractor for any prefabrication or installation performed prior to this coordination. Verify the proper voltage and phase of all equipment with the electrical plans.

D. Location of Utilities Prior to Trenching or Earthwork: The Contractor shall notify the Owner a minimum of two business days prior to beginning trenching or earthwork. Prior to this notification, the Contractor shall have marked all proposed trenches with paint and shall have contacted a utility locating company and have had this company mark all found underground utilities with paint. The Contractor shall then coordinate and arrange for a site visit with the Owner to review the proposed trenching and/or earthwork areas. Trenching and/or earthwork shall not begin until the Owner agrees. Repair and/or compensation for repair of marked utilities is the responsibility of the Contractor. The Owner retains the right to either self-perform the repair or require the Contractor to complete the repair, as directed by the Owner. If while performing the work, the Contractor discovers utilities that have not been marked, the Contractor shall immediately notify the Owner verbally and in writing.

1.6 GUARANTEE

A. Guarantee shall be in accordance with the General Conditions. The Contractor shall repair any defects due to faulty materials or workmanship and pay for any resulting damage to other work which appears within the guarantee period. These Specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner through the Engineer.

1.7 QUIETNESS

A. Piping, ductwork and equipment shall be arranged and supported so that vibration is a minimum and is not transmitted to the structure.

1.8 DAMAGES BY LEAKS

A. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

1.9 EXAMINATION OF SITE

A. The Contractor shall examine the site, compare it with Plans and Specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

1.10 COMPATIBILITY WITH EXISTING SYSTEMS

A. Any work which is done as an addition, expansion or remodel of an existing system shall be compatible with that system.

1.11 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be new unless otherwise noted. Materials and equipment of a given type shall be by the same manufacturer. Materials and equipment shall be free of dents, scratches, marks, shipping tags and all defacing features at time of project acceptance. Materials and equipment shall be covered or otherwise protected during construction as required to maintain the material and equipment in new factory condition until project acceptance. All HVAC equipment and ductwork shall be covered, sealed and protected per CGBSC Section 5.504.3 from delivery on site until final start-up.

1.12 SUBMITTALS

A. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project. Material or equipment shall not be ordered or installed until written review is processed by the Engineer.
All shop drawings must comply with the following:

1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory. FAX submittals are not acceptable.
2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a

suitable binder with title sheet including Project, Engineer and Contractor, table of contents, and indexed tabs dividing each group of materials or item of equipment. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on drawings.

3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be high-lighted, circled or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled or detailed.

4. Electronic Submittals: Where allowed by Division 01, electronic submittals are acceptable providing the following requirements are met. Electronic submittals which do not comply with these requirements will be rejected.

   a. Submittal shall be a single file in PDF format, with bookmarks for table of contents and each tab, and sub-bookmarks for each item.

   b. All text shall be searchable (except text that is part of a graphic).

   c. Submittal shall include all items noted in 1 through 3 above, except a binder is not required.

   d. Electronic submittals shall be processed through normal channels. Do not submit directly to the Engineer unless the Engineer is the prime consultant for the project.

   e. Contractor shall provide Owner and Owner’s Representative with hard copies of the final submittal. Coordinate exact number required with Owner through Architect/Engineer.

B. Substitutions: Manufacturers and model numbers listed in the specifications or on the drawings represent the standard of quality and features desired. Proposed substitutions shall comply with the Owner’s General Requirements. Calculations and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items. At the Engineer's request, furnish locations where equipment similar to the substituted equipment is installed and operating along with the user's phone numbers and contact person. Satisfactory operation and service history will be considered in the acceptance or rejection of the proposed substitution.

C. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. If a resubmittal is required, submit a complete copy of the Engineer's review letter requiring such with the resubmittal.

1.13 MANUFACTURER'S RECOMMENDATIONS

A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of the particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

1.14 SCHEDULING OF WORK

A. All work shall be scheduled subject to the review of the Engineer and the Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work, and shall cause

no delay to other Contractors engaged upon this project or to the Owner. HVAC equipment and functions, whether existing or new, shall be maintained in operating condition whenever the facility is occupied, unless otherwise approved by the Owner.

1.15 DEMOLITION

A. Existing equipment, ducts, piping, etc. noted for removal shall be removed and delivered to the Owner at a location to be determined by the Owner. Those items determined by the Owner to be of no value shall become the property of the Contractor and shall be removed from the job site by the Contractor at the Contractor's expense. Existing piping, ducts, services, etc. requiring capping shall be capped below floors, behind walls, above ceilings or above roof unless otherwise noted. Where items are removed, patch the surfaces to match the existing surfaces.

1.16 HAZARDOUS MATERIAL REMOVAL

A. All hazardous material removal will be by the Owner. Hazardous material is to be removed before the work is started. If the Contractor discovers hazardous material which has not been removed, the Contractor shall immediately cease work in that area and promptly notify the Owner.

1.17 OPENINGS, CUTTING AND PATCHING

A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Patching of these surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor’s expense to the satisfaction of the Engineer.

1.18 EXCAVATION AND BACKFILL

A. General: Barrel of pipe shall have uniform support on sand bed. Sand shall be free from clay or organic material, suitable for the purpose intended and shall be of such size that 90 percent to 100 percent will pass a No. 4 sieve and not more than 5 percent will pass a No. 200 sieve. Unless otherwise noted, minimum earth cover above top of pipe or tubing outside building walls shall be 24”, not including base and paving in paved areas.

B. Excavation: Width of trench at top of pipe shall be minimum of 16”, plus the outside diameter of the pipe. Provide all shoring required by site conditions. Where over excavation occurs, provide compacted sand backfill to pipe bottom. Where groundwater is encountered, remove to keep excavation dry, using well points and pumps as required.

C. Backfill:

1. 6” Below, Around, and to 12” Above Pipe: Material shall be sand. Place carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.
2. One Foot Above Pipe to Grade: Material shall be sandy or silty loam, free of lumps, laid in 6” layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6” layers may be used, subject to review by Engineer.

D. Compaction: Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at top, bottom and one-half of the trench depth. Perform these tests at three locations per 100’ of trench.

1.19 CONTINUITY OF SERVICES

A. Existing services and systems shall be maintained except for short intervals when connections are made. The Contractor shall be responsible for interruptions of services and shall repair damage done to any existing service caused by the work. If utilities not indicated on the drawings are uncovered during excavation, the Contractor shall notify the Engineer immediately.

1.20 PROTECTIVE COATING FOR UNDERGROUND PIPING

A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru-Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. John-Mansville. Protective coating shall be extended 6" above surrounding grade.

1.21 ACCESS DOORS

A. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings. 16-gage steel frame and 14-gage steel door with paintable finish, except in ceramic tile, where door shall be 16-gage stainless steel with satin finish. Continuous hinge. Deliver doors to the General Contractor for installation. Milcor. Unless otherwise noted, the minimum sizes shall be as follows:

1 valve up to 1-1/2"	12" x 12"
1 valve up to 3"	16" x 16"

1.22 HOUSEKEEPING PAD

A. Housekeeping pads shall be 6" high concrete, 3000 PSI strength, unless otherwise noted. Pad shall extend 6" beyond the largest dimensions of the equipment, unless otherwise noted. The top edge of the pad shall have a 3/4" chamfer. Unless otherwise noted, the pad shall have #4 reinforcing bars at 12" on center, each way, located at mid-depth of the pad. If not poured at the same time as the slab with pad rebar tied to slab rebar, the pad shall be anchored as follows: Drill 5/8" diameter, 3" deep hole in slab. Install 7" long, #4 rebar with Simpson Set epoxy system. Provide a minimum of 4 of these anchors per pad, but no more than 4 feet apart in either direction. Anchor points shall be 12" from the edge of the pad.

1.23 CONCRETE ANCHORS

A. Steel bolt with expansion anchor requiring a drilled hole - powder driven anchors, adhesive anchors and concrete screws are not acceptable. Re-use of screw anchor holes shall not be permitted. Minimum concrete embedment shall be 4-1/2 diameters. Minimum spacing shall be 12 diameters center to center and 6 diameters center to edge of concrete. Post-installed anchors in concrete used for component anchorage shall be pre-qualified for seismic application in accordance with ACI 355.2 and ICC-ES AC193. Post-installed anchors in masonry used for component anchorage shall be pre-qualified for seismic applications in accordance with ICC-ES AC01. Maximum allowable loads for tension and shear shall be as determined by Calculation in compliance with ACI 318-14, Chapter 17, and the anchor's ICC or IAPMO evaluation report. Hilti, Powers, Red Head.

1.24 EQUIPMENT ANCHORING AND OTHER SUPPORTS

A. Mechanical systems (equipment, ductwork, piping, conduit, etc.) shall be anchored in accordance with the CBC. All systems mounted on concrete shall be secured with a concrete anchor at each mounting point. All air handlers shall be mounted on spring isolators. Secure base plate as indicated above. Attachment of equipment, ductwork, piping, conduit, etc. supported on curbs or platforms shall be made to the side of curbs and platforms, where possible. Where screws or lag bolts must be installed through the top of a sheet metal cap, the installation shall be as follows. Pre-drill pilot hole. Fill pilot hole with polyurethane sealant. Install screw or lag bolt with a flat washer and an EPDM washer adjacent to the sheet metal.

1.25 SUPPORTS AND SEISMIC RESTRAINTS

A. Any structural element required to hang or support piping, ducts or equipment provided under this Division and not shown on other drawings shall be provided under this Division.

B. Mechanical systems (equipment, ductwork, piping, etc.) shall be provided with supports and seismic restraints in accordance with the CBC. Submit anchorage calculations and details stamped and signed by a structural engineer registered in the State of California. Submit shop drawings showing location, type and detail of restraints. Submit manufacturer's data for restraints. Restraint system shall be Mason West, Inc. (OSHPD OPM 0043-13), or other OSHPD preapproved system.

1.26 PAINTING

A. Paint all black iron supports, hangers, anchors, etc. with two coats of rust resisting primer. Also

paint all uninsulated black iron piping exposed to weather with two coats of rust resisting primer.

1.27 ROOF PENETRATIONS AND PATCHING

A. Whenever any part of the mechanical systems penetrates the roof or exterior wall, the openings shall be flashed and counter-flashed water tight with minimum 22 gauge galvanized sheet metal. Flashing shall extend not less than eight inches from the duct, pipe, or supporting member in all directions unless detailed otherwise. All roof penetrations and patching shall be in accordance with the recommendations of the National Roofing Contractor's Association and the Owner’s roofing standards.

1.28 SYSTEM IDENTIFICATION

A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by pre-printed markers or stenciled marking, and include arrows to show direction of flow. Pre-printed markers shall be the type that wrap completely around the pipe, requiring no other means of fastening such as tape, adhesive, etc. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portions of lines. Marking of short branches and repetitive branches for equipment connections is not required.

B. Below Grade Piping: Bury a continuous, pre-printed, bright-colored, metallic ribbon marker capable of being located with a metal detector with each underground pipe. Locate directly over buried pipe, 6” to 8” below finished grade.

C. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. AC-4) and identifies the area or space served by the equipment. Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the exterior of the unit.

D. Valves: Provide stamped brass valve tags with brass hooks or chains on all valves of each piping system, excluding check valves, valves within equipment, faucets, stops and shut-off valves at fixtures and other repetitive terminal units. Prepare and submit a tagged-valve schedule, listing each valve by tag number, location and piping service.

1.29 CLEANING

A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work. This includes but is not limited to building surfaces, piping, equipment and ductwork, inside and out. Surfaces shall be free of dirt, grease, labels, tags, tape, rust, and all foreign material.

B. At the end of each work day, the Contractor shall cover all open ends of piping and ductwork with protective plastic.

1.30 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Printed: Three copies of Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts list for all faucets, trim, valves, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. AC-3). All Wiring Diagrams shall agree with reviewed Shop Drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Pumps, Fans, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included.

B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instructions that apply to the control system. The Engineer's office shall be notified 48 hours prior to this meeting.

C. Acknowledgment: The Contractor shall prepare a letter indicating that all operation and maintenance instructions (printed and verbal) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the

Engineer.

1.31 RECORD DRAWINGS

A. The Contractor shall obtain one set of prints for the project, upon which a record of all construction changes shall be made. As the work progresses, the Contractor shall maintain a record of all deviations in the work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e. building, curbs, walks. In addition, the water, gas, sewer, under floor duct, etc. within the building shall be recorded by offset distances from building walls. An electronic copy of the original drawings will be made available to the Contractor. The Contractor shall transfer the changes, notations, etc. from the marked-up prints to the electronic copy. The record drawings (marked-up prints, electronic drawings disc and a hard copy) shall be submitted to the Engineer for review.

1.32 ACCEPTANCE TESTING

A. The Contractor shall perform, document and submit all acceptance testing as required by California Code of Regulations, Title 24, Part 6.

END OF SECTION

SECTION 22 0400
PLUMBING

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The General Mechanical Provisions, Section 20 01, 00, shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE:

A. Included: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:

1. Sanitary sewer system.
2. Domestic water system.
3. Drain system (including condensate drain).
4. All equipment as shown or noted on the drawings or as specified.
5. Demolition as indicated on drawings. Where demolition is called for, remove all equipment, piping, braces, housekeeping pads, supports and related items no longer required.
6. Lead Free: All equipment, fixtures, valves and fixture stops providing water for human consumption installed after January 1, 2010, must meet the “Lead Free” requirements for the State of California.

B. Work Specified Elsewhere:

1. Line voltage power wiring, disconnect switches and installation of all starters are included in the Electrical Section unless otherwise noted.
2. Access doors.
3. Concrete and reinforcing steel unless specifically called for on the drawings or specifications.
4. Painting unless specifically called for in the drawings or specifications.
5. Carpentry.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS:

A. Sanitary Sewer:

1. Soil, Waste and Vent Piping (Non-Pressurized):
   a. Inside Building and Within Five Feet of Building Walls: Standard weight coated cast iron pipe and fittings. Plain end, CISPI 301, ASTM A888, or hub end with rubber gaskets, ASTM A74, ASTM C564. ABI, Tyler, Charlotte. Couplings shall be heavy-duty shielded couplings. Type 304 stainless steel, with neoprene gasket, ASTM C1540. Husky HD 2000, Clamp-All 80, Mission HeavyWeight. MG Couplings are also acceptable. 2" and smaller exposed to view shall be galvanized steel, ASTM A53, with coated cast iron recessed drainage fittings, ANSI B16.12.

   Where required by soil conditions, as determined by the method described in ASTM A74-09, Appendix X2, below grade cast iron pipe and fittings shall have 8 mil (minimum) Polyethylene Encasement (Poly Wrap), Per ANSI/AWWA C105/A21.5.
2. Cleanouts: Comparable models of Josam, Wade, Mifab or Zurn are acceptable. Grease plug prior to installation. Floor Cleanouts: Smith 4023 with nickel bronze top in finished areas; Smith 4223 in utility areas. Wall Cleanouts: Smith 4532 with stainless steel cover and screw. Pipe Cleanouts: Iron body with threaded brass plug. Site cleanouts more than 5’ outside building may be PVC with PVC plug.
3. Cleanout Box: Precast reinforced concrete. Cast iron lid marked for service. Christy F8 in foot traffic areas; G5 in roadways. Provide with PVC pipe extension down to top of

pipe.

B. Water:

1. Hot and Cold Water Piping: Materials used in the water system, except valves and similar devices, shall be of like material, except where otherwise approved by Engineer and Authority Having Jurisdiction, prior to start of work.

a. Inside Building, Within Five Feet of Building Walls, and All Above Grade:

(1) Hard temper seamless copper, ASTM B88. Wrought copper fittings, ANSI B16.22. Type L with brazed joints (1100F, min.). 1-1/2" and smaller above grade may be soldered, lead-free solder. All nipples shall be lead-free red brass (85% copper). Above grade fittings may be copper press fittings, ASME B16.18 or ASME B16.22. EPDM O-rings. Installation shall be in accordance with the manufacturer's installation instructions. ProPress.

2. Valves and Specialties:

a. Valves:

(1) General: Manufacturer's model numbers are listed to complete description. Equivalent models of Crane, Kitz, Milwaukee, Nibco, Stockham, Walworth or Watts are acceptable. All valves of a particular type or for a particular service shall be by the same manufacturer. Butterfly valves may be substituted for 2-1/2" and larger gate valves above grade; see specification below. Provide a minimum of two operating "T" handles for underground valves for each underground system where valves are required. The lengths of the handles are dependent upon the depth of the valves and the ability of the handles to fully open and/or close the valves. At least one "T" handle for each system shall be on site at the beginning of the installation of a particular system for emergencies, and the Construction Manager shall have access to these "T" handles and valves.

(2) Gate Valve: 2" and Smaller: All bronze. Non-rising stem. Threaded bonnet. Wedge disk. Malleable iron handwheel. 200 psi CWP. Nibco T-113-LF. 2-1/2" and Larger: Iron body, bronze mounted. Non-rising stem. Resilient wedge disk. 200 psi CWP. Flanged or AWWA hub end as applicable. Nibco F-619-RWS. Underground valves shall have square operating nut.

(3) Butterfly Valve: Ductile iron threaded lug body. Aluminum bronze disk. EPDM molded-in liner and seals. 416 stainless steel shaft. 6" and smaller valves shall have multi-position lever handle. 8" and larger valves shall have gear operator. Provide 2" extension neck at insulated pipes. Nibco LD-2000.

(4) Check Valve: Lead-free bronze swing check, regrinding. 200 psi CWP. Nibco T-413-Y-LF. For vertical applications use lead-free bronze, spring-loaded, lift-type. Nibco T-480-Y-LF.

(5) Ball Valve: Full port. Lead free brass body, cap, stem, disk and ball. Screwed connection. Lever handle. PTFE seat and stem packing. Min. 400 psi CWP. CSA-US and UL listed. Nibco T-FP-600A-LF.

(6) Valve Box: Precast reinforced concrete. Cast iron lid marked for service. Christy F8 in foot traffic areas; G5 in roadways. Provide with PVC pipe extension down to top of pipe.

b. Miscellaneous Specialties:

(1) Temperature and Pressure Relief Valve: ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. Watts.

(2) Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi. Unions for copper piping shall be copper or lead free cast bronze. Anvil. Size 2-1/2" and Larger: Grooved pipe, synthetic gasket, malleable iron housing. EPDM gasket, NSF 61 rated. Victaulic Style 77, Gruvlok.

(3) Dielectric Coupling: Insulating union or flange rated for 250 psig. Wilkins DUXL Series.

(4) Shock Absorber: Multiple bellows. All stainless steel construction. Designed and applied in accordance with PDI WH201. Amtrol, Smith, Wade, Zurn.

C. Drain Piping (including Condensate): Same as inside building cold water piping.

D. Miscellaneous Piping Items:

1. Pipe Support:

a. Pipe Hanger: Steel "J" hanger with side bolt for piping 4" and smaller; steel clevis hanger for piping 5" and larger. Load and jam nuts. Size and maximum load per manufacturer's recommendation. Felt liner for copper piping. Hanger and rod shall have galvanized finish. B-Line, Anvil, Unistrut.

b. Isolating Shield: Galvanized steel shell and reinforcing ribs. 1/4" non-conducting hair felt pad. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Semco, Superstrut.

c. Construction Channel: 12-gage, 1-5/8" x 1-5/8" galvanized steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Anvil, Unistrut.

2. Flashing: Vent flashing shall be 4 lb/ft2 lead, 16" sq. flange, length sufficient to be turned down 2" into vent. Oatey. Flashing for other piping through roof shall be prefabricated galvanized steel roof jacks with 16" sq. flange. Provide clamp-on storm collar and seal water tight with mastic. For cold process built-up roof, material shall be 4 lb/ft^2 lead instead of galvanized steel. For single-ply roofing, use the roofing manufacturer’s recommended flashing material.

2.2 PIPING INSULATION MATERIALS:

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Pre-Molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft2-F at a mean temperature of 50F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping to 140°F, thickness shall be 1" for pipe sizes less than 1”; 1-1/2" thickness for pipe sizes 1" and 1-1/2”; 2” thickness for 2” and larger. See Title 24, Part 6 “California Energy Code” for temperatures above 140°F. Knauf, Johns-Manville, Owens-Corning.

C. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft2-F at a mean temperature of 50F. 1-1/2" thickness. Knauf, Johns-Manville, Owens-Corning.

D. PVC Jacket (for pipe, fittings and valves): Pre-molded polyvinyl chloride (PVC) jackets, 0.020" thickness. Size to match application. Provide solvent weld adhesive and PVC vapor barrier pressure sealing tape by same manufacturer. Zeston.

E. Stretchable Glass Fabric: Reinforcing mesh. 10 X 20 continuous filament glass yarns per inch. Johns-Manville.

F. Vapor Barrier Coating: Childers CP-30, Foster 30-25.

G. Lagging Adhesive: Childers CP-50A, Foster 30-36.

H. Aluminum Jacketing: Aluminum pipe and fitting jacketing. 0.016" thickness for straight pipe. 0.024" thickness for fittings. Stucco-embossed finish. Integral moisture barrier. Provide pre-fabricated aluminum strapping and seals by same manufacturer. Childers.

I. Outdoor Mastic: Childers CP-10, Foster 65-05.

J. Insulating Tape: Ground virgin cork and synthetic elastomeric. Black, odorless, and non-toxic. K factor 0.43 Btu-in/hr-ft2-F or less. Non-shrinking. For outdoor use, provide protective finish by same manufacturer. Halstead.

K. Molded Closed Cell Vinyl (Piping Insulation Under Lavatories and Sinks): Fully molded closed cell vinyl, 1/8" thick, minimum. Thermal conductivity shall not exceed 1.17 BTU-in/hr-ft^2-ºF at an average temperature of 73ºF. Weep hole in cleanout nut enclosure. Hinged cap over valve to allow access for servicing. Out of sight nylon fastening system and internal ribs on drain insulation to provide air gap (Lav-Guard Only). Truebro Lav-guard, McGuire Pro Wrap, Plumberex.

2.3 FIXTURES:

A. General: Provide rough-in for and install all plumbing fixtures shown on drawings. Except in equipment rooms, all trim, valves and piping not concealed in wall structure, above ceiling or below floors, shall be brass with polished chrome plate finish, unless noted otherwise. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.

B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures and trim. Manufacturer's model numbers are listed to complete description. Equivalent models of American Standard, Eljer, Elkay, Haws, Just, Kohler, Moen, T&S Brass, Willoughby or Zurn are acceptable. For drainage fixtures, equivalent models of Josam, Mifab, Smith, Wade or Zurn are acceptable.

C. Stops and P-Traps: All fixtures shall be provided with stops and P-Traps as applicable. Wall mounted faucets, valves, etc. shall have integral stops or wall mounted stops.

1. Stops: All hot and cold water supplies shall be 1/2" I.P.S. inlet angle stops with stuffing box, loose key lock shield, and brass riser (3/8" for 2-1/2 gpm and less, otherwise 1/2"). ¼ turn ball stops do not require stuffing box. Dahl, McGuire, Speedway.
2. P-Traps: Semi-cast brass, ground joint. 17-gage. Clean-out plug. Unobstructed waterway. California Tubular, McGuire.

D. Caulking: Caulk fixtures with white G.E. "Sanitary SCS1700", mildew resistant silicone sealant with EPA listed anti-microbial.

2.4 EQUIPMENT:

A. General Requirements:

1. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
2. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
3. Ratings -Electrical: Electrical equipment shall be in accordance with NEMA standards and UL or ETL listed where applicable standards have been established.
4. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
5. Electrical:

a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be manual reset, and shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as

applicable.

b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts and other devices shall be in ungrounded conductors.

c. Motors: Shall be rated, constructed and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Motors exposed to weather shall be TEFC. Vertical motors with exposed fans shall have rain caps.

d. Starters: Motor starters shall be furnished for all equipment except where starter is in a motor control center as designated on the electrical drawings. Deliver starter to Electrical Contractor for installation and wiring.

e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt control circuit from integral protected transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.

f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.

B. Electric Drinking Fountain with Bottle Filler: Wall hung. Provide steel mounting brackets. Stainless steel basin. Removable grid drain. Chrome plated brass bubbler with automatic flow regulator and self-closing valve. Non-ferrous evaporator. Lead solder shall not be used. Hermetic compressor with automatic reset overload protection. Air cooled condenser. Adjustable thermostat. UL listed. ARI certified. Elkay, Halsey-Taylor, Haws, Sunroc.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION:

A. General:

1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Architect. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted.

2. Joints:

a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.

b. Brazed: Filler rod shall be of suitable or the same alloy as pipe. Brazing filler metal shall have a minimum melting point of 1100F. Brazing shall be performed by a Certified Brazer as certified by an organization/institution that uses standards recognized by the American Welding Society (AWS) and meets the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.

c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.

d. Electrical Equipment: Piping shall not be run over electrical panels, motor control centers or switchboards.

3. Fittings and Valves:

a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.

b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.

c. Unions: A union shall be installed on the leaving side of each valve, at all sides of automatic valves, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.

d. Valves: All valves shall be full line size. Provide shut-off valve for each building and each equipment connection. Provide shut-off valve at each point of connection to existing piping. At equipment connections, valves shall be full size of upstream piping.

e. Valve Accessibility: All valves shall be located so that they are easily accessible. Valves located above ceilings shall be installed within 24" of the ceiling. For situations where this is not practical or where valves are greater than 10' above the floor, chain wheel operators shall be provided. Chain shall extend down to 7' above the floor. All such installations must have prior review by the Engineer.

4. Pipe Support:

a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Side beam clamps shall be provided with retaining straps to secure the clamp to the opposite side of the beam. Vertical piping shall be supported with riser clamp at 20' on center (maximum). Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. Copper piping systems which protrude through a surface for connection to a fixture stop or other outlet shall be secured with a drop ell, Nibco 707-3-5, to a Holdrite Model #SB1 bracket; nipple through surface shall be threaded brass.

(1) Pressure Pipe:

Pipe Size (Inches)	Maximum Spacing* Between Supports (ft.)	
	Copper	Sch. 40 steel
1/2	6	6
3/4	6	8
1	6	8
1-1/4	6	10
1-1/2	6	10
2	10	10
2-1/2	10	10
3	10	10
4	10	10
6	10	10

*Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves or other fittings. Seismic requirements may reduce maximum spacing.

(2) Gravity Drain Pipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.

b. Hot and Cold Water Piping: All hot and cold water piping shall have isolating shield; no portion of this piping shall touch the structure without an isolating shield except at anchor points for fixture rough-in.

c. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for review.

5. Miscellaneous:

a. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings, or floors in finished areas.

b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" annular clearance between sleeve and pipe for piping 3" and

smaller, otherwise 2" annular clearance. Piping through walls below grade shall be sealed with Link-Seal.

c. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space surrounding the pipe or pipe insulation sealed with fire rated materials in accordance with the requirements of 2019 CBC Section 714.

d. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined, except that bronze valves may be installed in ferrous piping without dielectric couplings.

B. Sanitary Sewer Piping:

1. General: Where inverts are not indicated, sanitary sewer piping shall be installed at 1/4" per foot pitch. Piping 4" and larger may be installed at 1/8" per foot pitch where structural or other limitations prevent installation at a greater pitch. Bell and spigot piping shall be installed with barrel on sand bed; excavate hole for bell.

2. Cleanouts: Install cleanouts at ends of lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface.

3. Vents: Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10' of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2' minimum from gutters, parapets, ridges and roof flashing.

C. Water Piping: Connections to branches and risers shall be made from top of main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual connections to each fixture in battery. Minimum pipe size shall be 1/2", unless otherwise noted. Exposed fixture stops and flush valves shall be installed with brass nipples for copper piping and galvanized nipples for galvanized piping. Nipples are to extend from outside of wall to fitting at header or drop behind finish wall surfaces. Pipe nipples shall be same size as stop or flush valve. Provide shut off for each building and each connection to equipment. Shock absorbers shall be installed in a vertical position as indicated on drawings. Only equipment mounted on vibration isolators shall be connected with flexible connections. Underground hot water and cold water piping which run parallel to each other shall be installed a minimum of 3 feet apart.

D. Drain Piping (Including Condensate): Install with constant pitch to receptacle, 1/4" per foot where possible, otherwise 1/8" per foot minimum. Provide TEE with clean-out plug at all changes of direction. Provide trap at each air handling unit to prevent air leakage. Only equipment mounted on vibration isolators shall be connected with flexible connection. Piping not concealed in wall structure, above ceilings or below floors shall be chrome plated brass, except in equipment rooms, piping shall be galvanized steel. P&T relief and water heater drain piping shall be galvanized steel. Provide secondary drain piping where required.

3.2 PIPING INSULATION INSTALLATION:

A. Domestic Hot Water:

1. General: All domestic hot water piping, fittings and accessories shall be insulated.

2. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied pressure sealing tape.

3. Fittings and Valves:

a. Wrap all fittings and valves with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Solvent weld. Seal all joints with factory supplied pressure sealing vapor barrier tape with 1-1/2" (min.) overlap on both sides of joint. Insulate valves to stem. Do not insulate unions, flanges or valves unless water temperature exceeds 140F or the piping is exposed to weather.

b. For miscellaneous fittings and accessories for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the Contractor may cover the fiberglass blanket with stretchable glass fabric, one coat of lagging adhesive and a final coat of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.

4. Additional Finish for Exposed Piping and Equipment: All piping and equipment exposed to view but protected from the weather shall be given an additional finish of PVC jackets.

B. Cold Water Piping-Freeze Protection: All cold water piping exposed to weather or other areas subject to freezing (i.e. ventilated attics, uninsulated exterior soffits, etc.) shall be insulated same as hot water piping. Cover with aluminum jacketing where exposed to weather. Short lengths of pipe and valves may be wrapped with insulating tape, 50% overlap. Cover valves to stem. Apply at least two coats of protective finish where exposed to weather.

C. Piping Insulation Under Lavatories and Sinks: Exposed water piping, water stops and drain piping under lavatories and sinks shall be insulated with 1/8" thick molded closed cell vinyl. Installation shall be in accordance with manufacturer's instructions.

3.3 FIXTURE INSTALLATION:

A. Fixture Height: Shall be as indicated on Architectural drawings.

B. Floor Drains or Floor Sinks: Shall be placed parallel to room surfaces, set level, flush with floor, and adjusted to proper height to drain. Cover openings during construction to keep all foreign matter out of drain line.

C. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).

D. Floor Mounted Fixtures: Shall be provided with proper support plates. Caulk floor mounted fixtures with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).

E. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

3.4 EQUIPMENT INSTALLATION:

A. General: It shall be the responsibility of the equipment installer to insure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment. All equipment shall be securely anchored in place.

B. Connections to Equipment: Where size changes are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.5 TESTS AND ADJUSTMENTS:

A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Architect. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections, however, all connections between sections previously tested and new section shall be included in the new test.

B. Gravity Systems:

1. Sanitary Sewer: All ends of the sanitary sewer system shall be capped and lines filled with water to the top of the highest vent, 10' above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours.
2. Drains (Including Condensate): Similar to Sanitary Sewer.

C. Pressure Systems:

1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made.
2. Domestic Hot and Cold Water Piping: Maintain 100 psig water pressure for 4 hours.

D. Fixtures: Provide torque testing of water closet carrier anchor bolts in presence of Inspector. If Inspector is not available, a testing agency shall handle the inspection.

3.6 DISINFECTION:

A. Disinfect all domestic water piping in accordance with 2019 CPC Section 609.9, and in accordance with administrative authority. Disinfection process shall be performed in cooperation with health department having jurisdiction and witnessed by a representative of the Architect. During procedure signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, one set of water samples shall be collected by Contractor for bacteriological analysis in presence of Inspector. If the water fails the bacteriological test, Contractor shall disinfect the piping again and pay for any retesting required, at no additional cost to owner. Bacteriological testing results shall be obtained by Contractor and delivered to the Owner through the Architect before project completion. Contractor shall include copy of Bacteriological Test Results at closeout with operation and maintenance manuals.

END OF SECTION

SECTION 23 0800
HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The General Mechanical Provisions, Section 20 01 00, shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE

A. Included: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:

1. Air distribution system.
2. All equipment as shown or noted on the drawings or as specified. Furnish motor starters except where motor control centers are used. Coordinate with Division 26.
3. Circulating water system.
4. Refrigeration system.
5. System energy balance.
6. Coordinate with Section 25 09 00 (Direct Digital Control System) regarding location and installation of system sensors, valves, actuators, etc. and to provide simultaneous start-up.
7. Demolition as indicated on drawings. Where demolition is called for, remove all equipment, piping, ductwork, braces, supports, housekeeping pads, temperature controls and related items no longer required.

B. Work Specified Elsewhere:

1. Line voltage power wiring to equipment, motor starters in motor control centers, disconnect switches and installation of all starters are included in the Electrical Sections, unless otherwise noted.
2. Connection of condensate drains and domestic water to equipment.
3. Access doors.
4. Concrete and reinforcing steel unless specifically called for in the drawings or specifications.
5. Painting unless specifically called for in the drawings or specifications.
6. Carpentry.
7. Direct Digital Control System.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Hot or Chilled Water Piping:

1. Above Grade:
   a. 2" and Smaller: Schedule 40 black steel pipe, ASTM A53. 150 psi black malleable iron screwed fittings, ANSI B16.3.
   b. 2-1/2" Through 4": Screwed pipe as above -OR- welded or grooved pipe as below.
   c. 6" and Larger: Schedule 40 black steel pipe, ASTM A53. Standard weight carbon steel welding fittings, long radius ells, ANSI B16.9. Joints may be grooved pipe unions, EPDM gaskets. Grinnell, Gruvlok, Victaulic.
2. Valves and Specialties:
   a. Valves:
      (1) General: Manufacturer's model numbers are listed to complete description. Equivalent models of Crane, Milwaukee, Nibco, Stockham, Walworth, as well as Grinnell, Gruvlok and Victaulic for

grooved joint systems, are acceptable. All valves of a particular type or for a particular service shall be by the same manufacturer. Butterfly valves may be substituted for 2-1/2" and larger gate valves above grade; see specification below.

(2) Gate Valve: Provide 2" extension necks at insulated pipes, where required. 2" and Smaller: All bronze. Rising stem. Union bonnet. Wedge disk. Screwed connection. Malleable iron handwheel. Class 125. Nibco T-124. 2-1/2" and Larger: Iron body, bronze mounted. Non-rising stem. Resilient wedge. Class 125. Flanged or AWWA hub end as applicable. Nibco F-619-RWS. Underground valves shall have square operating nut. Provide one operating "T" handle for underground valves.

(3) Butterfly Valve: Iron threaded lug body. Aluminum bronze disk. O-ring seals. Resilient, removable seat. 416 stainless steel shaft. 6" and smaller valves shall have multi-position lever handle. 8" and larger valves shall have gear operator. Provide 2" extension neck at insulated pipes. Demco Series NE, Grinnell, Stockham.

(4) Plug Valve: Eccentric bronze or nickel plated semi-steel plug, semi-steel body, bronze bushings, Buna-N-rings. 175 psi WOG. KeyPort Valve Series 400.

(5) Check Valve: Non-slam, lift type. Replaceable bronze seat, disk and bushings. Stainless steel helical spring. Disk guided at top and bottom. Flow area through valve shall exceed cross sectional area of pipe. 150 psi WOG. CPV, Mueller Steam Specialty. 2" and Smaller: Shall be screwed brass with hand lapped bronze disk. 2-1/2" and Larger: Shall be iron body, wafer or flanged with resilient Buna-N or TFE facing on seat.

(6) Ball Valve: Full port. Bronze body, cap, stem, disk and ball. Screwed connection. Lever handle. TFE seat. O-ring seals. 300 psi WOG. Apollo, Nibco, Jomar.

(7) Globe Valve: All bronze. Renewable TFE disk. Screwed connection. Malleable iron handwheel. Union bonnet. Class 150. Stockham B-22.

(8) Valve Box: Pre-cast reinforced concrete. Cast iron lid marked for services. Christy F22 in foot traffic areas; G5 in roadways.

b. Instruments:

(1) Pressure Gage: Phosphor bronze tube. Bronze bushed. 1% accuracy. Cast aluminum case. 3-1/2" white dial. Adjustable pointer. Operating pressure at midscale. 1/4" NPT brass socket. Provide brass porous core pressure snubber and gage cock. Trerice, Weksler, Winters.

(2) Thermometer: 3" dial. Stainless steel case. Back or bottom connected as required. 1/2" NPT. 20-240ºF, 2ºF divisions for hot water, 25-125ºF, 2ºF divisions for chilled water. 2" insertion length. Allowance to be made for insulation thickness. Marshalltown, Moeller, Taylor, Tel Tru, Winters.

(3) Thermometer Well: Brass well. Suitable for 3" dial thermometer above. Provide 2" extension at insulated pipes.

(4) Gage Cock: Lever handle brass cock. 1/4" NPT connections. Provide 2" extension at insulated pipes.

(5) Instrument Well: Suitable for temperature sensing element. Coordinate with supplier of temperature controls.

(6) Flow Switch: Paddle type. McDonnell No. FS4-3.

c. Miscellaneous Specialties:

(1) Pressure Relief Valve: ASME rated fully automatic, reseating pressure relief valve sized in accordance with energy input. Watts.

(2) Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi. Grinnell. Size 2-1/2" and Larger: Grooved pipe, synthetic

gasket, malleable iron housing. Victaulic Style 77, type "E" gasket, Grinnell.

(3) Balancing Cock: Calibrated all bronze balancing/shutoff valve or cock. Screwed connections. Memory stop. Position indicator. Drain connection. Taps for differential pressure gage, with check valves or shutoffs. 125 psi working pressure. Internal seals. Preformed insulation block. Armstrong, FlowSet by Flow Design, Inc., Grinnell, Tour and Andersson, Victaulic.

(4) Strainer: "Y" type, 125 psi. Machined seats. Stainless steel screens. Provide gate valve blowoff with hose threads. Bailey, Mueller Steam Specialty.

2" and Smaller: Screwed bronze body. Perforation size 0.057".

2-1/2" and Larger: Flanged iron body, perforation size as follows:

Pipe Size	Perforation Dia.
2-1/2" - 3"	1/16"
4" - 6"	3/32"
8" and Larger	1/8"

(5) Dielectric Coupling: Insulating union, flange or waterway fitting rated for 250 psig. EPCO, Clearflow.

(6) Flexible Connection: 2" and Smaller: Screwed connection. Corrugated bronze core covered with high tensile bronze tubular braid. 150 psi working pressure. Flexonics, Keflex. 2-1/2" and Larger: Contoured, molded Teflon bellows. Minimum of three convolutions. Monel reinforcing rings. Limit bolts. Flanged connection. 100 psi working pressure. Belmont, Resistoflex. -Or- Multiple laminations of 321 stainless steel. 150 psi working pressure. Limit bolts. Flanged connection. Hyspan Series 5500.

B. Refrigerant Piping: Hard drawn Type ACR copper, dried and capped, ASTM B280. Wrought copper fittings, silver alloy brazed, 1100ºF, Silfos.

C. Miscellaneous Piping Items:

1. Pipe Support:

a. Pipe Hanger: Steel "J" hanger with side bolt. Load and jam nuts. Size and maximum load per manufacturer's recommendations. Felt liner for copper piping. Hanger and rod shall have galvanized finish. B-Line, Unistrut.

b. Isolating Shield: Galvanized steel shell and reinforcing ribs. 1/4" non-conducting hair felt pad. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Semco.

c. Construction Channel: 12-gage, 1-5/8" x 1-5/8" galvanized steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Unistrut.

2. Flashing: Flashing for piping through roof shall be prefabricated galvanized steel roof jacks with 16" square flange around pipe. Provide clamp-on storm collar and seal water tight with mastic. Maintain dielectric separation between copper and galvanized materials. For cold process built-up roof, material shall be 4 lb/ft^2 lead instead of galvanized steel.

2.2 PIPING INSULATION MATERIALS

A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. PVC Jacket (for pipe, fittings and valves): Pre-molded polyvinyl chloride (PVC) jackets, 0.020" thickness. Size to match application. Provide solvent weld adhesive and PVC vapor barrier pressure sealing tape by same manufacturer. Zeston.

C. Aluminum Jacketing: Aluminum pipe and fitting jacketing, 0.016" thickness for straight pipe. 0.024" thickness for fittings. Integral moisture barrier. Stucco-Embossed finish. Provide pre-fabricated aluminum strapping and seals by same manufacturer. ITW or RPR.

D. Metal Jacketing Sealant: Childers CP-76, Foster 95-44.

E. Flexible Elastomeric: Closed cell flexible elastomeric preformed pipe insulation. Thermal conductivity shall not exceed 0.27 Btu-in/hr-ft^2-ºF at a mean temperature of 70ºF. 1/2" thick. Provide #520 adhesive and Armaflex insulation pipe hangers by same manufacturer. Armacell Armaflex.

2.3 DUCTWORK MATERIALS:

A. General: All ductwork materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50. Shall comply with 2019 CMC.

B. Metal Ductwork: Metal ductwork shall be galvanized sheet steel, lock forming quality, ASTM A-653, with gage and construction to match SMACNA Standard for pressure required (26 gage minimum).

C. Flexible Ductwork: Insulated flexible ductwork. One pound per cubic foot glass fiber insulation, 1-1/2" thick (R-6), 2” thick (R-8) where ductwork is outside the building thermal insulation envelope. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft2-ºF at a mean temperature of 75ºF. Seamless metalized reinforced polyester vapor barrier jacket. Duct shall comply with NFPA 90A. Continuous internal liner bonded to galvanized steel wire helix. Duct shall be capable of continuous operation at 1-1/2" of positive water static pressure and 4,000 ft/min air velocity. JP Lamborn.

D. Duct Sealants: All Joints Exposed to Weather: Sealant shall be water based, Foster 32-19/32-17, Childers CP-146/148, United Duct Sealer WB or G.E. “SilPruf” SCS2000 silicone sealant. Joints Not Exposed to Weather (Except Spiral Wound Exposed to View in Finished Areas): Fiber reinforced. White in color. Foster 32-17, Childers CP-148, Design Polymerics DP1030, Hardcast Versa-Grip 181, Hardcast CCWI-181. Spiral Wound Joints Not Exposed to Weather and Exposed to View in Finished Areas: Non fibrated. Gray in color. Foster 32-19, Childers CP-146, Design Polymerics DP 1010, or United Duct Sealer WB.

E. Spiral Wound Metal Ductwork: Spiral wound factory fabricated galvanized steel, gages in accordance with the CMC. All fittings shall be factory fabricated. Fittings exposed to view shall have all seams fully welded. Tees and laterals shall be conical type. Connections to plenums shall be with bell mouth fittings. 12" and smaller ells shall be two piece die stamped. Ells larger than 12" shall be five piece. McGill Airflow. Shop fabricated fittings are not acceptable.

2.4 AIR TERMINALS AND DUCT FITTINGS:

A. Grilles: (Grilles, Registers, Diffusers and Louvers)

1. Information on Drawings: Refer to Grille Schedule on the drawings for the list of grilles. Manufacturer's model numbers are listed to complete the description Titus. Equivalent models of Anemostat or Krueger are acceptable. Refer to the floor plans for neck size, CFM, air diffusion pattern and fire damper, if required.
2. Performance: Submit complete performance data (throw, pressure drop, noise level, etc.) for all grilles proposed, other than those scheduled. Testing shall be in accordance with ANSI/ASHRAE 70-1991. If, according to the certified data of the manufacturer of the proposed units, the sizes indicated on the drawings will not perform satisfactorily, the units shall be reselected by the Contractor for the proper diffusion, spread, pressure drop, throw and noise level.
3. Frame and Accessories: Supply, return, and exhaust grilles shall not have an opposed blade volume control damper unless otherwise noted. All surface mounted grilles shall have a perimeter gasket and flanged edge. All grilles shall have frames suitable for mounting in the surfaces designated by the architectural drawings. Key or screwdriver operated, no slide bars.
4. Finish: All ceiling and wall grilles and all louvers shall have a paintable white finish unless otherwise noted. Interior components (everything behind the face plate) shall be flat black. Floor grilles shall have an anodized aluminum finish unless otherwise noted.

B. Branch Duct Volume Damper: Volume control damper (VCD) in rectangular ducts shall be as follows: Opposed blade, 6" maximum blade width, 16-gage blade, 48" maximum length, nylon or oil impregnated bronze bearings, 1/2" diameter pin shaft, 16-gage channel frame, actuating rod and linkage out of air stream. VCD in round duct shall be as follows: Damper blade full height of branch and 1" less than branch width. All branch dampers shall have regulator with stamped steel handle, spring loaded shaft nut, cast body and serrated self-locking die cast core. Regulator for horizontal ducts overhead shall be mounted on sides or bottom of ducts. Secure a 12" length of brightly colored plastic ribbon to handle for ease of location. Where rectangular or round ductwork is insulated, slit insulation to allow handle to protrude. Ventlok 641 (with 607 end bearing for round ducts).

C. Extractor: Curved blade turns in adjustable position rigid frame. Tuttle and Bailey Deflectrol.

D. Turning Vanes: Double wall, hollow metal, air foil shape. Spacing in accordance with manufacturer's recommendations. Aero Dyne HEP.

E. Flexible Connection: UL listed neoprene coated 30 ounce fiberglass cloth. 3" metal, 3" fabric, 3" metal. Ventglas.

F. Fire/Smoke Damper: California State Fire Marshal approved. UL listed and labeled indicating fire rating. Hour rating as required by the rating of the wall, ceiling, floor, etc. in which it is installed. Combination fire/smoke dampers shall have normally-closed, non-stall factory electric actuator rated for 250ºF (min.) and shall be Leakage Class II.

G. Duct Access Door:

1. Rectangular: Insulated double wall door. Full piano hinge. Cam latch. Pressure rating to match application. Air Balance, Ductmate.
2. Round: Three layers of stamped steel. Inside panel shall consist of two layers of metal which are spotwelded together along the rim, encapsulating high density fiberglass insulation (25/50 rated). Closed cell neoprene gasket bonded to the inside of the door. Zinc plated conical springs installed between the inner and outer door. Polypropylene molded knobs with threaded metal inserts. Knobs shall be easily turned by hand and shall be UL94HB listed. Zinc plated carriage bolts, clinched and sealed to the inner door. Provide self adhesive template for the exact size of duct opening. Pressure rating to match application. Ductmate.

H. Variable Air Volume Terminal (VAV/VVH):

1. General: Pressure independent, single-duct electric powered variable volume terminal. Scheduled pressure drop is maximum allowable at inlet static at design conditions. Provide integral flow taps and calibration chart on each unit. Performance testing shall be in accordance with ARI Standards. Enviro-Tec, Titus.
2. Casing: Welded 24-gage galvanized steel. Provide hanger holes on four corners. Interior insulation shall be 1/2" thick, 1-1/2 lb. density glass fiber with high density facing. Insulation shall be UL listed and in compliance with NFPA 90A. Maximum allowable leak rate 2% at 3" WC.
3. Controls: Provide integral cross flow velocity sensor furnished and installed at the factory.
4. Coils: Units specified with hot water coils shall have factory installed access panel upstream of the coil and shall have coil with 1/2" O.D. seamless copper tube with 0.017" tube wall. Fin tube expanded into fin collar for permanent bond. Leak tested at 300 psig.
5. Sound Performance Data: Discharge sound and radiated sound levels shall not exceed the published sound levels of the terminals which were used as the basis of design. The manufacturer shall submit discharge sound and radiated sound data in both sound power level (ref: 10-12 watts) in octave bands and noise criteria (NC) ratings. Testing shall be in accordance with ARI Standards.

I. Kitchen Hood:

1. General: Factory fabricated in accordance with CMC Chapter 5 and State codes. Install with bottom of hood 48" above cooking surface. UL labeled. Greenheck.
2. Materials: Unless otherwise noted, all visible elements of the hood shall be constructed of stainless steel, 18 gage, type 304, with a No. 4 polished finish. All seams shall have a

liquid tight, continuous weld, ground smooth and polished. Provide factory stainless steel enclosure panels.

3. Filters: Filters shall be fixed baffle type. 20 gage stainless steel construction. Filters shall be furnished with handles. Blank panels shall be installed where required to symmetrically space filters. 20 gage full length stainless steel filter rack with continuous, removable, stainless steel grease trough.

4. Lights: UL listed vapor proof lights. Conduit and conductors shall be pre-wired to a J-box on top of canopy.

2.5 DUCTWORK INSULATION MATERIALS:

A. General: All ductwork insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.

B. Fiberglass Blanket: **Installed** thermal resistance at a mean temperature of 75ºF shall meet or exceed indicated value. 3/4 lb/ft^3 or 1 lb/ft^3, **R-6** where ductwork is within the building thermal insulation envelope. 3/4 lb/ft^3 **R-8** where ductwork is outside the building thermal insulation envelope and/or above the roof. Faced with glass reinforced foil laminated to Kraft paper. Certainteed, Knauf, Johns-Manville, Owens-Corning.

C. Acoustic Lining: Glass fiber. **Installed** thermal resistance at a mean temperature of 75ºF shall meet or exceed indicated value. One side coated to prevent fiber erosion up to 6000 ft/min. Average noise reduction coefficient of 0.80. 1.5 lb/ft^3 density. 1" thick (**R-4.2**) where ductwork is within the building thermal insulation envelope. 2" thick (**R-8**) where ductwork is outside the building thermal insulation envelope and/or above the roof. Certainteed, Knauf, Johns-Manville, Owens-Corning.

D. Bonding Adhesive: Design Polymerics DP2501, Foster 85-60.

E. Fire Resistive Duct Wrap: Nominal 1-1/2” thick, 6 lb/ft3 high-temperature fiber blanket thermal insulation encapsulated in a fiberglass-reinforced aluminized polyester foil. Grease Duct Listing Standards (Double Wrap) ASTM E 2336 / ICC-ES AC101. Ventilation Duct Listing Standard (Single Wrap) – ISO 6944. 3M Fire Barrier Duct Wrap 615+.

2.6 EQUIPMENT

A. General Requirements:

1. Start-up: All equipment shall be started and tested in accordance with the manufacturer’s written instructions. Start-up procedure shall be performed by a factory trained service technician – not the installing contractor. Provide the inspector of record with factory start-up literature for each mechanical equipment item. Demonstrate to inspector that the start-up procedure has been completed. Start-up sheets shall be completed and submitted with O&M manuals. Start-up sheets shall be submitted, certifying that start-up has been completed per manufacturer’s written instructions.

2. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.

3. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Where Architectural screening is indicated, equipment shall not extend above or beyond screening. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.

4. Ratings: Electrical equipment shall be in accordance with NEMA Standards and UL or ETL listed where applicable standards have been established.

5. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. For equipment mounted on springs, provide flex connections. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.

6. Electrical:

a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be NEMA rated, manual reset, shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.

b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts and other devices shall be in ungrounded conductors.

c. Motors: Shall be rated, constructed and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction unless otherwise noted. Motors 1 HP and above shall be NEMA premium efficiency, Class F insulation. Motors in a fan air stream shall be TEFC or TEAO. Vertical motors exposed to weather shall be TEFC and shall have rain caps. Horizontal motors exposed to weather shall be TEFC. Motors for use with VFD's shall be inverter ready.

d. Starters: Motor starters shall be furnished for all equipment except where starter is in a motor control center as designated on the electrical drawings. Deliver starter to Electrical Contractor for installation and wiring.

e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt control circuit from integral protected transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.

f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.

7. Fan Selection:

a. Fan Curves: Performance curves shall be submitted for all units of 3000 CFM or greater. Operating point for forward curved fans shall be from point of maximum efficiency toward increased CFM limited by horsepower scheduled. Operating point for backward inclined fans shall be selected near point of maximum efficiency. Curves shall plot CFM verses static pressure with constant brake horsepower, RPM and efficiency lines.

b. Static Pressure: Unless otherwise noted, pressure scheduled as external static pressure (ESP) includes all ductwork and accessory losses external to the unit housing. Unless otherwise noted, pressure scheduled as total static pressure includes all ductwork, filter, coil, cabinet, damper and other accessory losses. Unless otherwise noted, pressure scheduled as duct static pressure includes all supply and return ductwork and accessory losses external to the unit housing and plenum (as applicable). The allowance for filter losses is 0.3" WC, unless otherwise noted. Submit itemized static pressure losses for all components.

8. Filters:

a. General: Tested and rated in accordance with ASHRAE Standard 52.2 and Title 24, C.C.R. Furnish and install one complete change of all filters after air balance is completed and prior to acceptance.

b. Filter Media: 2" media. MERV-13. Clean filter resistance 0.41" water at 500 fpm. Throw-away frame. Class 2. Camfil AP-Thirteen.

9. Screens: All duct or louver openings to the outside shall be covered with 1/2", 16-gage, galvanized wire mesh screen.

10. Mixing Dampers: Opposed blade, 16 gage. Six inch maximum blade width, 48" maximum length. Nylon or oil impregnated bronze bearings. One half inch diameter

pin shaft. 16 gage channel frame. One percent maximum leakage at 4" WC in accordance with AMCA 500 for outside air dampers. Actuating rod out of air stream. Arrow.

11. Sound Ratings: Shall be in accordance with ASHRAE 36 - 72. Sound ratings shall not exceed scheduled values.

12. Drives: Unless noted as direct connected, drives shall be V-belt, rated at 150% of motor horsepower. Multiple drive belts shall be matched set. Drive sheaves shall be dynamically balanced, adjustable, range +/- 10%, selected at mid range. Adjustable relative movement shall be lockable to shaft. Belts shall be aligned within 1-1/2 degrees at all times. Open drives shall be provided with OSHA approved open mesh belt guards. Belt guards exposed to weather shall be weatherproof enclosure with louvered face for adequate ventilation. Driving motor shall be mounted on adjustable rails. T.B. Woods, Browning. Submit RPM range of driven machine with drive selection.

13. Coils:

a. Construction: Copper tube. Copper or aluminum 0.0075" min. thickness fins hydraulically or mechanically bonded to tube. 16 gage galvanized steel rigid channel coil casing. Rated working pressure 200 psig min. All coils shall have connections at the same end. Wherever two or more coils are being controlled by a single control valve, each coil shall be installed with a separate balancing cock and a Pete's Plug at each outlet.

b. Capacity: Ratings certified by ARI in accordance with ARI Standard 410. Cooling coil face velocity shall not exceed manufacturer's published ratings or 600 fpm. Heating coil face velocity shall not exceed 1000 fpm. Include coil selection calculations in shop drawings.

c. Hot or Chilled Water Coils: Copper or cast iron headers, brazed or spun to tube. Tube wall minimum thickness 0.024". 10 fins/inch maximum.

d. Direct Expansion Coils: Copper suction header silver brazed to tubes, distributing tubes and expansion valve. Working pressure 250 psig minimum. 10 fins/inch maximum.

B. Indoor / Outdoor Units: Variable capacity, heat pump heat recovery air conditioning system providing cooling or heating. Refer to Paragraph 2.6A for general requirements. All components shall be by same manufacturer. Daikin.

1. Outdoor Unit: The outdoor unit is designed specifically for use with Daikin VRV IV series components.

a. The condensing unit shall be factory assembled in the USA and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of Daikin inverter scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant accumulator.

b. Liquid and suction lines must be individually insulated between the condensing and indoor units.

c. The condensing unit can be wired and piped with access from the left, right, rear or bottom.

d. The connection ratio of indoor units to condensing unit shall be permitted up to 200%.

e. Each condensing system shall be able to support the connection of up to 64 indoor units dependent on the model of the condensing unit.

f. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The condensing unit shall be capable of operating automatically at further reduced noise during night time or via an external input

g. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.

h. The unit shall incorporate an auto-charging feature to ensure optimum performance. Manual changing should be support with a minimum of 2 hours of system operation data to ensure correct operation

i. The condensing unit shall be modular in design and should allow for side-by-side installation with minimum spacing.

j. The following safety devices shall be included on the condensing unit; high pressure sensor and switch, low pressure switch, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.

k. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit shall be provided with a sub-cooling feature.

l. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation

m. The condensing unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls or an auxiliary heat source.

n. Unit Cabinet: The condensing 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.

o. Fan:

(1) The condensing unit shall consist of one or more propeller type, direct-drive 350 or 750 W fan motors that have multiple speed operation via a DC (digitally commutating) inverter.

(2) The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.

(3) The fan shall be a vertical discharge configuration with a nominal airflow maximum range of 5,544 CFM to 22,283 CFM dependent on model specified

(4) The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.

(5) The fan motor shall be provided with a fan guard to prevent contact with moving parts.

(6) Night setback control of the fan motor for low noise operation by way of automatically limiting the maximum speed shall be a standard feature. Operation sound level shall be selectable from 3 steps.

p. Condenser Coil:

(1) The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.

(2) The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.

(3) The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.

(4) The fins are to be covered with an anti-corrosion Ulta Gold coating as standard with a salt spray test rating of 1000hr(ASTM B117), Acetic acid salt spray test: 500hr(ASTM G85)

(5) The pipe plates shall be treated with powdered polyester resin for corrosion prevention.

q. Compressor:

(1) The Daikin inverter scroll compressors shall be variable speed (PVM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. The target suction pressure should be capable of automatic reset based on outdoor temperature and system load to improve efficiency. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency) shall be controlled to eliminate deviation from target value.

(2) The inverter driven compressors in the condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G-type” or “J-type”.

(3) Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.

(4) The capacity control range shall be as low as 10% to 100%.

(5) Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.

(6) Oil separators shall be standard with the equipment together with an intelligent oil management system.

(7) The compressor shall be spring mounted to avoid the transmission of vibration eliminating the standard need for spring insolation

(8) In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be designed to specifically address this condition for single module and manifolded systems.

(9) In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours. When connected to a central control system sequential start is activated for all system on each DIII network

r. Electrical:

(1) The power supply to the condensing unit shall be 208-230 volts, 3 phase, 60 hertz +/- 10%.

(2) The control voltage between the indoor and condensing unit shall be 16VDC non-shielded, stranded 2 conductor cable.

(3) The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one condensing unit with one 2-cable wire, thus simplifying the wiring installation

2. Branch Selector Box for VRV IV Heat Recovery System: The branch selector boxes are designed specifically for use with VRV IV series heat recovery system components.
   a. These selector boxes shall be factory assembled, wired, and piped.
   b. These branch controllers must be run tested at the factory.
   c. These selector boxes must be mounted indoors.
   d. When simultaneously heating and cooling, the units in heating mode shall energize their subcooling solenoid valve.
   e. The number of connectable indoor units shall be in accordance with the manufacturer's recommendations.
   f. Unit Cabinet:
      (1) These units shall have a galvanized steel plate casing.
      (2) Each cabinet shall house multiple refrigeration control valves and a liquid gas separator.
      (3) The cabinet shall contain a tube in tube heat exchanger.
      (4) The unit shall have sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene.
   g. Dimensions: Each BSVQ unit shall be no larger than 8-3/16" x 15-5/16" x 12-7/8".
   h. Refrigerant Valves:
      (1) The unit shall be furnished with 5 electronic expansion valves to control the direction of refrigerant flow.
      (2) The refrigerant connections must be of the braze type.
      (3) Each circuit shall have at least one (36,000 Btu/h fan coil unit or smaller for the BSVQ36PVJU and 60,000 Btu/h fan coil unit or smaller for the BSVQ60PVJU) branch selector box.
      (4) Multiple circuits may be connected to a branch selector box with the use of a REFNET™ joint provided they are within the capacity range of the branch selector.
   i. Drainage: The unit shall not require any condensate drainage connection.
   j. Electrical:
      (1) The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
      (2) The unit shall be capable of operation within the limits of 187 volts to 255 volts.
      (3) The minimum circuit amps (MCA) shall be 0.1 and the maximum fuse amps (MFA) shall be 15.
      (4) The control voltage between the indoor and outdoor unit shall be 16VDC non-shielded 2 conductor cable.

3. Indoor Unit – Wall Mounted: Shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. Compact design with finished white casing. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while inhibiting changes in room temperature when used with Daikin remote control BRC1D71 and BRC2A71. A mildew-proof, polystyrene air filter and condensate drain pan shall be included as standard equipment. The indoor units sound pressure shall range from 32 dB(A) to 35 dB(A) at low speed measured at 3.3 feet below and from the unit.

a. Indoor Unit:

(1) The unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.

(2) Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

(3) Both refrigerant lines shall be insulated from the outdoor unit.

(4) Return air shall be through a resin net mold resistant filter.

(5) The indoor units shall be equipped with a condensate pan.

(6) The indoor units shall be equipped with a return air thermistor.

(7) The indoor unit will be separately powered with 208~230V/1-phase/60Hz.

(8) The voltage range will be 253 volts maximum and 187 volts minimum.

b. Unit Cabinet:

(1) The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.

(2) The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

c. Fan:

(1) The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.

(2) The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.

(3) The airflow rate shall be available in high and low settings.

(4) The fan motor shall be thermally protected.

d. Coil:

(1) Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

(2) The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

(3) The coil shall be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested.

(4) The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.

(5) A thermistor will be located on the liquid and gas line.

(6) A condensate pan shall be located in the unit.

e. Electrical:

(1) A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

(2) Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

(3) Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

f. Control:

(1) The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

g. Accessories Available:

(1) BRC2A71 “in-room” wired remote controller.

(2) A condensate pump.

4. Indoor Unit – Ceiling Cassette: Round flow ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, direct drive DC (ECM) type fan, for installation into the ceiling cavity equipped with an air panel grill. It shall be a round flow air distribution type, fresh white, impact resistant decoration panel, or optional self-cleaning filter panel. The supply air is distributed via four individually motorized louvers. To save energy and optimize occupancy comfort, the indoor unit shall be equipped with built in occupancy sensor and surface temperature sensor. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC1E73, BRC2A71 and BRC1E52B7. The indoor units sound pressure shall range from 30 dB(A) to 45 dB(A) at High speed measured at 5 feet below the unit.

a. Indoor Unit:

(1) The unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.

(2) Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

(3) Both refrigerant lines shall be insulated from the outdoor unit.

(4) The round flow supply air flow can be field modified to 23 different airflow patterns to accommodate various installation configurations including corner installations.

(5) Return air shall be through the concentric panel, which includes a resin net, mold resistant, antibacterial filter.

(6) The indoor units shall be equipped with a condensate pan with antibacterial treatment and condensate pump. The condensate pump provides up to 33-1/2” of lift from bottom of unit to top of drain piping and has a built-in safety shutoff and alarm.

(7) The indoor units shall be equipped with a return air thermistor.

(8) The indoor unit will be separately powered with 208~230V/1-phase/60Hz.

(9) The voltage range will be 253 volts maximum and 187 volts minimum.

(10) To save energy and optimize occupancy comfort, the indoor unit shall be equipped with built in occupancy sensor and surface temperature sensor.

(11) Supplied air shall be directed automatically by four individually controlled louvers.

b. Unit Cabinet:

(1) The cabinet shall be space saving and shall be located into the ceiling.

(2) Four auto-adjusted louvers shall be available to choose, which include standard, draft prevention and ceiling stain prevention.

(3) The airflow of the unit shall have the ability to shut down outlets with multiple patterns allowing for simpler installation in irregular spaces.

(4) Fresh air intake shall be possible by way of Daikin's optional fresh air intake kit.

(5) A branch duct knockout shall exist for branch ducting of supply air.

(6) The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

(7) Optional high efficiency air filters are available for each model unit.

c. Fan:

(1) The fan shall be direct-drive DC (ECM) type fan, statically and dynamically balanced impeller with three fan speeds available.

(2) The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.08 to 0.16 HP.

(3) The airflow rate shall be available in three manual settings.

(4) The DC fan shall be able to automatically adjust the fan speed in 5 speeds based on the space load.

(5) The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings to allow operation with the high efficiency air filter options.

(6) The fan motor shall be thermally protected.

d. Filter:

(1) The return air shall be filtered by means of a washable long-life filter with mildew proof resin and antibacterial treatment.

(2) Optional high efficiency disposable air filters shall be available.

(3) Optional Self-Cleaning Filter Panel, which performs automatic filter cleaning up to once a day, with dust collection box that indicates when to be emptied.

e. Coil:

(1) Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

(2) The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

(3) The coil shall be a 2, or 3-row cross fin copper evaporator coil with up to 21 FPI design completely factory tested.

(4) The refrigerant connections shall be flare connections and the condensate will be 1 -1/4 inch outside diameter PVC.

(5) A condensate pan with antibacterial treatment shall be located under the coil.

(6) A thermistor will be located on the liquid and gas line.

f. Electrical:

(1) A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

(2) Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

(3) Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

g. Control:

(1) The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

(2) The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.

(3) The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

(4) For the Sensing functions and the optional Self-Cleaning Filter functions, Remote controller BRC1E73/BRC1E52B7 shall be used. Consult with Daikin prior to applying controls.

h. Accessories:

(1) Remote “in-room” sensor kit (KRCS01-4B).

5. Indoor Unit – Concealed Ceiling Ducted: Shall be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, direct-drive DC (ECM) type fan with auto CFM adjustment at commissioning, for installation into the ceiling cavity. It is constructed of a galvanized steel casing. It shall be a horizontal discharge air with horizontal return air configuration. All models feature a low height cabinet making them applicable to ceiling pockets that tend to be shallow. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E71 and BRC2A71. Included as standard equipment, a condensate drain pan and drain pump kit that pumps to 18-3/8” from the drain pipe opening. The indoor units sound pressure shall range from 29 dB(A) to 40 dB(A) at low speed measured 5 feet below the ducted unit.

a. Indoor Unit:

(1) The indoor unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall be equipment with automatically adjusting external static pressure logic that is selectable during commissioning. This adjusts the airflow based on the installed external static pressure.

(2) Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

(3) Both refrigerant lines shall be insulated from the outdoor unit.

(4) The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 18-3/8” of lift from the center of the drain outlet and has a built in safety shutoff and alarm.

(5) The indoor units shall be equipped with a return air thermistor.

(6) The indoor unit will be separately powered with 208~230V/1-phase/60Hz.

(7) The voltage range will be 253 volts maximum and 187 volts minimum.

b. Unit Cabinet:

(1) The cabinet shall be located into the ceiling and ducted to the supply and return openings.

(2) The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

c. Fan:

(1) The fan shall be direct-drive DC (ECM) type fan, statically and dynamically balanced impeller with three fan speeds available.

(2) The unit shall be equipment with automatically adjusting external static pressure logic selectable during commissioning.

(3) The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range of 0.12 to 0.47 HP respectively.

(4) The airflow rate shall be available in three settings.

(5) The fan motor shall be thermally protected.

(6) The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings.

(7) Fan motor external static pressure range for nominal airflow:

d. Coil:

(1) Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

(2) The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

(3) The coil shall be a 3 row cross fin copper evaporator coil with 13 fpi design completely factory tested.

(4) The refrigerant connections shall be flare connections and the condensate will be 1-1/4" outside diameter PVC.

(5) A condensate pan shall be located under the coil.

(6) A condensate pump with an 18-3/8" lift shall be located below the coil in the condensate pan with a built in safety alarm.

(7) A thermistor will be located on the liquid and gas line.

e. Electrical:

(1) A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

(2) Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

(3) Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

f. Control:

(1) The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

(2) The unit shall be compatible with interfacing with a BMS system via a BACnet gateways.

(3) The unit shall be compatible with a Daikin intelligent Touch advanced multi-zone controller or an intelligent Manager III customizable BMS. Consult with Daikin prior to applying controls.

(4) BRC2A71 "in-room" wired remote controller.

C. Air Handler:

1. General: Pressure classification, type, and accessories/options as indicated on schedules. Refer to Paragraph 2-06A for general requirements. All motors 1 horsepower and larger shall be the premium efficiency type, VFD duty where applicable. McQuay.

2. Cabinet: Galvanized steel channel post and panels. Bulb type gasketing between each frame channel and unit panel to provide thermal break between inner and outer casing components. Gasketing to meet UL 723 for surface burning characteristics. Casing leak rate not to exceed 0.5 cfm/ft² of cabinet area at 5" static pressure. External casing constructed of minimum 16 gauge G90 galvanized steel frame with 18 gauge panels. Units shipped in sections shall have splice connectors extending across the section-to-section joint, with bulb type gasketing to prevent air leakage between joints. Access doors to be double wall, constructed of galvanized steel, flush mounted to cabinetry, gasket sealed, with stainless steel hinges, door latch, and full size handle. Provide 2" thick, injected foam insulation in walls, roof, and floor for an R-value of 13, with 20 gauge G90 solid galvanized steel inner liner. Provide integral formed galvanized steel base rail of height shown on schedule for each shipping section, minimum 4" height.

3. Supply/Return Fans: DWDI FC, BI, or AF or SWSI AF type and pressure class, as indicated on schedules. Fan, motor, and drive mounted on internally isolated steel base, dynamically balanced as an assembly. Maximum fan rpm below the first critical fan speed. Motor base capable of sliding out the side of unit for removal. Access to motor, drive, fan, and bearings through hinged access doors, with inspection windows, on both sides of fan section. Internal spring vibration isolators with 2" deflection and seismic snubbers. Fan bearings to be sealed, self-aligning, grease lubricated, heavy-duty pillow block type with copper lubrication lines extended to access door location. Bearings to be load rated in accordance with AFBMA-ANSI Standard with L-50 life rating at 200,000 hours. V-Belt drive with variable and adjustable pitch sheaves selected for required fan rpm with set point at mid-position. Motor to be open drip proof, 1 speed, unless otherwise noted on schedule.

4. Sound Level: Submit factory fan sound data, by octave band for discharge and radiated sound. Sound level of specified model may not be exceeded.

5. Filter Box, Filter/Mixing Box, or Filter/Economizer Section: Factory fabricated and mounted section in arrangement shown or noted on drawings. Cabinet as specified in paragraph 2. Designed to hold as a minimum, 2" filters in "V" bank, or optional filters as scheduled. The filter sizes, quantity, and face area scheduled is minimum acceptable. Dampers shall be provided for mixing and/or exhaust for arrangement shown. Provide low leak dampers with leakage rate less than 0.20 of 1% at 2" static pressure differential, rated per AMCA Standard 500. Filter section to include racks for scheduled filters and hinged and latching doors on both sides of the section for side loading and removal.

6. Coil Section: Cabinet as specified in paragraph 2. Coils to be accessible from both sides of unit for service and cleaning. Headers and return bends fully enclosed within unit casing. Coil connections to extend minimum 5" beyond unit casing wall for field piping. Drain and vent connections on external coil connections. Piping penetrations factory sealed. Coils to be removable through side panels without disassembly of other sections. Performance in accordance with ARI 410, coils ARI and UL certified and listed. Drain pan to be constructed of stainless steel, cross-broken and pitched to drain connection to eliminated standing water. Pan to extend entire length of coil section. Provide intermediate drain pans for stacked coils. Drain connection to be minimum 3" above finished floor, plus the height of the unit base rail. Coils to have 5/8" o.d., 0.025" thick tube wall, minimum.

D. Exhaust Fan:

1. General: All exhaust fans shall be tested according to AMCA Standard 210 in an AMCA registered laboratory. Fans exposed to weather shall have ventilated weatherproof housing over motor and drive assembly. Refer to Paragraph 2.6A for general requirements. All direct drive fans shall be provided with unit mounted speed controllers, unless otherwise noted. All motors 1 horsepower and larger shall be the premium efficiency type.

2. Utility Fan (USF – Belt): Single width, single inlet housing. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model and individual serial number. UL 762 listed. Fans shall be equipped with lifting lugs. Constructed of heavy gauge steel. After fabrication, untreated steel components go through a multi-stage cleaning and pre-treatment process before being finished with a high-performance powder coating having a minimum thickness of 2-4 mils, electrostatically applied and baked. Coating must exceed 1,000-hour salt spray under ASTM B117 test method. No uncoated metal fan parts will be allowed. Fan shall be of airtight mechanically fastened seam construction with the scroll panel material formed and embedded into the side panels. All interior and exterior surface untreated steel shall be coated with a high-performance powder coating. Housing and bearing support shall be constructed of bolted framework. The fan wheel shall be of the single width backward inclined centrifugal type. Fan Wheel shall be statically and dynamically balanced to balance grade G6.3 per ANSI S2.19. The wheel and fan inlet shall be carefully matched and shall have precise running tolerances for maximum performance and operating efficiency. Motors shall meet or exceed EISA (Energy Independence and Security Act) efficiencies. Motors to be NEMA T-frame, TEFC. Drive belts and sheaves shall be sized for 150% of the fan operating brake horsepower, and shall be readily and easily accessible for service, if required.

Movable motor plate with adjustment screws to make belt tensioning operations. Fan shaft to be turned and polished steel that is sized so the first critical speed is at least 25% over the maximum operating speed for each pressure class. Fan shaft bearings shall be Air Handling Quality, bearings shall be heavy-duty grease lubricated, self-aligning or roller pillow block type. Air Handling Quality bearings to be designed with low swivel torque to allow the outer race of the bearing to pivot or swivel within the cast pillow block. Bearings shall be 100% tested for noise and vibration by the manufacturer. Bearings shall be 100% tested to insure the inner race diameter is within tolerance to prevent vibration. Bearings shall be selected for a basic rating fatigue life (L-10) of 80,000 hours at maximum operating speed for each pressure class. Bearings shall have Zerk fittings to allow for lubrication. Greenheck.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. General:

1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Engineer. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Lines shall be adequately braced against vertical and lateral movement. For piping connected to equipment mounted on springs, provide flex connections. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted. Pipe sizes shall not decrease in direction of flow, unless otherwise noted.
2. Joints:
   a. Threaded: Pipe shall be cut square, and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
   b. Brazed: Welding and brazing shall conform to American Welding Society (AWS) standards. Filler rod shall be of suitable or the same alloy as pipe. Brazing filler metal shall have a minimum melting point of 1100ºF. Brazing shall be performed by a Certified Brazer as certified by an organization/institution that uses standards recognized by the AWS and meets the requirements of the ASME Boiler and Pressure Vessels Code, Section 9. The Contractor shall submit welding procedures per AWS for project welds for testing lab review.
   c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
3. Fittings and Valves:
   a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
   b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
4. Pipe Support:
   a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below (based on straight lengths of pipe with couplings only). Provide additional supports for equipment, valves or other fittings. Seismic requirements may reduce maximum spacing. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Side beam clamps shall be provided with retaining straps to secure the clamp to the opposite side of the beam. Vertical piping

shall be supported with riser clamp at 20' on center (maximum). Support pipe within 12" of all changes in direction.

b. Refrigerant Piping: Support insulated refrigerant line with construction channel and sheet metal support saddle or Cooper B-Line Armafix clamps. 5' spacing. Use isolation shield for uninsulated pipe. When using pre-charged tubing, all changes of direction shall be made with bending tools producing neat uniform bends. Free hand bends will not be accepted.

c. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for review.

5. Miscellaneous:

a. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings, or floors in finished areas.

b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" (nominal) clearance between sleeve and pipe or pipe insulation.

c. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space surrounding the pipe or pipe insulation sealed with fire rated materials in accordance with the requirements of 2019 CBC Section 714.

B. Refrigerant Piping: Pipe shall be cut square. Joint surfaces shall be thoroughly cleaned, fitted and erected before brazing. After installation, evacuate to 29 inches of mercury, ambient temperature during evacuation shall not be less than 70ºF. After evacuation, fill with dry nitrogen to 250 psi and maintain for two-hour period without additional charge. After nitrogen test, purge with refrigerant charged through dryer and maintain holding charge in system and equipment. Refrigerant piping below grade shall be run in 4" (min.) PVC conduit with long radius ells. Seal ends of conduit watertight. VRF system fittings shall be as recommended by manufacturer. Installers shall have successfully completed manufacturer’s installation training within 6 months of installation. Provide training certificate or letter from manufacturer’s rep stating such.

3.2 PIPING INSULATION INSTALLATION

A. Refrigerant Piping: Cover piping with foamed plastic insulation. Longitudinal and end seams shall be thoroughly cemented with adhesive in accordance with manufacturer's recommendations. Cover all fittings, unions, valves and connections. Piping exposed to view shall be covered with PVC jacketing. Piping exposed to weather shall be covered with aluminum jacketing, install all joints and seams to prevent water entry, seal with 1/8” bead of gray metal jacketing sealant.

3.3 DUCTWORK INSTALLATION:

A. General:

1. Standards: Unless otherwise noted, all ductwork shall be constructed and installed in accordance with current SMACNA Standards. Ductwork shall be built to a pressure classification equal to or greater than the maximum operating pressure at that point in the ductwork. A copy of these standards shall be maintained at the job site at all times. Duct work and accessories shall be installed in a manner to prevent vibration and rattling.

2. Access: Provide duct access doors as required to adjust equipment and dampers. Provide wall or ceiling access panels, or remote actuators as required where equipment and dampers are not otherwise accessible. Ventlok 666 concealed remote actuator with zinc finish on cover.

3. Flexible Connections: Connection of ductwork to any vibrating equipment shall be with 3" (min.) flexible connection. Install with ample slack and uniform gap. There shall be no metal to metal contact across flexible connection. Flexible connections exposed to weather shall have a protective sheet metal cover.

4. Flanges and Escutcheon: Where ductwork penetrates walls, ceilings, or floors, furnish and install flange or escutcheon of same material as duct.

B. Low Velocity-Low Pressure (up to 2,000 ft/min and up to 2.0 in water):

1. Sheet Metal Ductwork:
   a. Ells: Ells with less than standard radius and square ells shall be fitted with turning vanes.
   b. Tees: Tees in supply ductwork shall be straight tap-in with extractor or 45 degree take-off as shown on drawings. Grilles or branches in supply ductwork shall be a minimum of 8 duct diameters downstream of tees.
   c. Duct Joints and Seams: All joints and seams which are not exposed to weather shall be sealed airtight with duct sealant. All joints and seams exposed to weather shall be sealed air and water tight with silicone sealant. (See Part 2 of this Specification). All joints on spiral wound metal ductwork not exposed to weather shall be sealed air tight with grey duct sealant.
   d. Dampers: Install volume control damper and damper regulator in all branch ducts.
2. Flexible Glass Fiber Ductwork: The use of flexible duct is limited to the last 5 feet of each branch duct (i.e. one 5 foot section of flexible duct may be used to connect the grille to the sheet metal branch duct). No joints are permitted in this 5' length. Hangers shall be 4" wide metal straps spaced to prevent sagging, 42" spacing maximum. Insert 6" wide fiberglass pad between duct and hanging strap. Joints shall be installed with stainless steel or nylon draw bands, Duro Dyne Dyn-O-Tie. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius of duct centerline not less than 1.5 times the duct diameter).
3. Spiral Wound Metal Ductwork: At side duct grilles, the grille shall be cut directly into the spiral duct. Duct to duct joints shall be made with the spiral seam rotated so that the seam forms a continuous helical pattern across the joint.

3.4 AIR TERMINALS AND DUCT FITTINGS INSTALLATION:

A. General: Unless otherwise noted, all air terminals and duct fittings shall be installed in accordance with current SMACNA Standards. Terminals and fittings shall be installed in a manner to prevent vibration and rattling. Metal surfaces exposed to view behind grilles and registers shall be painted flat black.

B. Fire/Smoke Damper: Shall be installed in accordance with the manufacturer's recommendations. Provide access doors as required, label per CBC. Manufacturer's instructions shall be available to the inspecting authorities. Shall be tested according to State Fire Marshal requirements.

3.5 DUCTWORK INSULATION INSTALLATION:

A. General: Insulate all sheet metal supply, return and outside air intake ductwork except as noted below. Insulation shall be continuous through walls and floors except at fire dampers.

B. Where Insulation Is Not Required: Do not insulate factory-insulated ducts or casings, acoustic lined ducts, fibrous glass ducts, underground ductwork, supply or return ductwork exposed to view in the space that it serves, or exhaust ductwork.

C. Concealed Ductwork: Wrap concealed ductwork including outside air intakes with fiberglass blanket lapped 2" minimum. Secure with staples 4" on centers maximum on straight runs and 3" maximum at elbows and fittings. Insulation on bottom of ducts wider than 36" shall also be secured with mechanical fasteners at 24" on center.

D. Acoustic Lining: Unless otherwise indicated, all supply and return ductwork in equipment rooms, all ductwork exposed to weather and other ducts as indicated on drawings, shall have acoustic lining. Do not acoustic line outside air intakes or evaporative cooling ductwork. Where acoustic lining is installed, increase each sheet metal dimension to accommodate lining and maintain clear inside duct dimensions shown on drawings. Apply lining with bonding adhesive in accordance with manufacturer's recommendations and also secure with mechanical fasteners in accordance with SMACNA Standards. Seal exposed edges of lining with bonding adhesive.

E. Fire Resistive Wrapped Ducts: Where indicated on drawings, ductwork shall be covered with fire resistive duct wrap. Install in accordance with it’s UL or Omega Point Laboratories Design number (as applicable) and the Manufacturer’s Installation Instructions.

3.6 EQUIPMENT INSTALLATION

A. General: The equipment installer shall ensure that no work done under other specification sections will in any way block or hinder the equipment. All equipment shall be securely anchored in place. Provide factory start-up for all equipment in the Central Plant.

B. Air Handling Units: Spring isolators shall be adjusted to allow movement to maximum free spring length. Piping support shall be designed so that piping weight does not bear on equipment. Hot water coil shall be mounted upstream of chilled water coil.

C. Gage Taps: Gage taps, such as Pete's Plugs, shall be installed immediately adjacent to all heat exchanger and pump connections (i.e. inlet and outlet of all pumps, boilers, chillers, condensers, coils, etc.). Taps shall be installed to allow for a pressure gage or thermometer to be easily inserted and read. Provide 1 set of gages (pressure gage with Pete's Plug adapter, chilled water thermometer and hot water thermometer). Deliver to Owner.

D. Connections to Equipment: Where size changes are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

E. Equipment Platforms: Shall be as shown on drawings and as follows: Flashing and platform cover shall be 22 gage (min.) sheet metal. All joints and seams shall be soldered with 2" (min.) overlaps. Provide 3/4" gap around perimeter between roofing and platform cover to facilitate re-roofing. Extend drip lip down 3" (min.). Provide 30# felt under platform cover.

3.7 TESTS AND ADJUSTMENTS

A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Engineer. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested.

B. Piping Tests:

1. General: Tests may be made in sections, however, all connections between sections previously tested and new section must be included in the new test. There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made.
2. Water Piping: Maintain 100 psig water pressure for 4 hours.

3.8 SYSTEM ENERGY BALANCE

A. Scope: Provide the services of an independent test and balance agency to test, adjust and balance, retest and record performance of the system to obtain design quantities as specified. The agency must prove that they have no affiliation with any equipment manufacturer, design engineer, installing contractor, or any other party which might lead to a conflict of interest, in order to provide an unbiased, third party system balance and report.

B. Qualifications: Prior to commencing work, the agency shall be reviewed by the Engineer and shall be certified by the Associated Air Balance Council or National Environmental Balancing Bureau. The agency shall provide documentation of having successfully completed at least five projects of similar size and scope. The Contractor must have sufficient personnel to respond to a trouble call at the site within two hours.

C. Instruments: All instruments shall be accurately calibrated; calibration histories shall be available for examination. Application of instrumentation shall be in accordance with AABC or NEBB standards.

D. Submittals: Include in shop drawings copies of forms to be used for testing and balancing showing all data which is to be recorded. Three copies of completed balance report shall be submitted for review.

E. Procedure - General: Procedure shall be in accordance with Associated Air Balance Council's "National Standards for Field Measurements and Instrumentation - Total System Balance", Volume Two, No. 12173, or equivalent NEBB standards. System shall be in full, continuous operation during test. Balanced quantities shall be plus 10%, minus 0% of design quantities. All nameplate data, manufacturer, model and serial numbers shall be recorded for each item tested.

F. Extended Warranty: The test and balance agency shall include an extended warranty of 90 days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck or resetting of any item or items in test report. The agency shall provide technicians to assist the Engineer in making any tests he may require during this period of time.

G. Air Balance Procedure (For Each Air Handling System):

1. All air filters shall be clean when air balance is performed.
2. Provide a sketch of the equipment showing exactly where all pressure readings were taken.
3. Adjust blower RPM to design requirements.
4. Record motor full load amperes.
5. Make pitot tube traverse of main supply and return ducts and obtain design CFM at fans.
6. Record system static pressures, inlet and discharge.
7. Record filter quantity, size(s) and pressure drop across filter(s) at each filter bank.
8. Adjust system for design CFM recirculated air.
9. Adjust system for design CFM outside air.
10. Record entering air temperatures. (DB heating, DB and WB cooling.)
11. Record leaving air temperatures. (DB heating, DB and WB cooling.)
12. Adjust all main supply and return air ducts to design CFM.
13. Adjust all zones to design CFM, supply and return.
14. Adjust all diffusers, grilles and registers to plus 10%, minus 0% of design requirements.
15. Adjust CFM at all exhaust fans, make-up units, etc. (high and low speed, where applicable). Record applicable data from items 1 through 11 above.
16. Each grille, diffuser and register shall be identified as to location.
17. Verify proper diffusion pattern for all ceiling grilles and that all sidewall grilles are set for 5 degrees upward deflection unless otherwise noted. Make a notation of any that are not set properly.
18. Size, type and manufacturer of diffusers, grilles, registers and all tested items shall be identified and listed. Manufacturer's ratings shall be used to make required calculations on all items.
19. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
20. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified. Testing agency shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.
21. All diffusers, grilles and registers shall be adjusted for required air patterns and to minimize drafts.
22. As a part of the work of this contract, THE AIR CONDITIONING CONTRACTOR shall make any changes in pulleys, belts and dampers or the addition of dampers required for correct balance as recommended by air balance agency, at no additional cost to Owner.
23. Set, test and adjust packaged heating/cooling unit economizer operation in cooperation with controls contractor. Record minimum and maximum outside and exhaust airflows.

H. Water Balance Procedure (For Each Pumping System):

1. Set valves for maximum coil flow.
2. Remove and clean all strainers.
3. Examine water in system and determine if water has been treated and cleaned.

4. Check expansion tanks to determine that they are properly charged and that the system is completely full of water. Bleed air from system.
5. Set operating temperatures of all equipment to design requirements.
6. Air balance must be complete before water balance begins.
7. Adjust pumps to design flow by use of differential pressure gage calibrated in feet of water.
8. Adjust water flow through all equipment to design flow.
9. Record leaving and return water temperatures at all equipment. Reset to correct design temperature.
10. Record water temperatures at inlet side of coils. Record rise or drop of temperatures from source.
11. Balance all coils for design flow and mark settings on flow controllers.
12. After coils are balanced, recheck settings at all equipment and readjust if required.
13. Record pressure drop through coils, and reset to design flow. Set pressure drop across bypass valve to match coil full flow pressure drop.
14. Record the following at each coil:
    a. Inlet water temperatures.
    b. Leaving water temperatures.
    c. Pressure drop across coil.
    d. Pressure drop across bypass valve.
15. Record pump suction and discharge pressures at operating condition and also with pump discharge valve completely closed.
16. Record running amperage of pump motor at operating condition and also with pump discharge valve completely closed.
17. Record water metering device readings.

3.9 WATER TREATMENT:

A. General: All new HVAC equipment and auxiliary water piping systems shall be cleaned, passivated and treated as herein specified. Chemical compound identifications are from San Joaquin Chemicals, Inc., a State of California Contractor, License #461677. A written generic formula including active ingredients percentages must be submitted for review to be accepted as equivalent. Provide treatment as required to control scale, corrosion, biological growth, foaming and general fouling. Chemical treatments indicated below are generic in nature, actual formulations, dosages and application shall be determined by analysis of the make-up water to be treated with consideration for the system metallurgy, type of treatment equipment employed and operating units characteristics. Initial cleaning, preparation and start-up shall be supervised by the water treatment company's field service application specialist having a minimum of ten (10) years' experience with these type applications. The water treatment contracting company shall have not less than fifteen (15) years' experience with these type applications.

B. Cleaning and Initial Preparations:

1. Initial Fill: As the first water is introduced into the system, add not less than 10 gallons for each 1,000 gallons of contained water volume of a liquid blend of alkaline detergent; SANASOLV ® 6103 for closed systems, SANACOR ® 2605 -WR metal passivator as a white rust inhibitor for open galvanized systems, and SANACOR ® CUI for metal passivator as an enhanced copper tube corrosion inhibitor, comprised of the following ingredients:

   Closed (Hot, Chilled, Non-Galvanized Open Systems):

   Sodium Silicate Penta-hydrate

   Sodium Tri-Polyphosphate

   Tri-Sodium Phosphate

   Dispersing Polymers

   Wetting Agent, non-ionic

2. Circulation: The above closed loop detergent shall be re-circulated for not less than twelve (12) hours/not more than forty-eight (48) hours after which the system shall be

rapidly dumped with re-circulating pumps operating to provide maximum practical motion, and whenever possible, with simultaneously adding or chasing with rinse water. It is important that make-up water rate exceed water discharge rate. In either case, the system shall be flushed until neutral to phenolphthalein, reaches the same pH and TDS levels as the clean flushing water and is free from suspended material and color.

a. After flushing, all strainers shall be removed and cleaned. If the system contained a significant level of suspended solids, recirculating pump seal replacement may be required as requested by the project engineer as recommended by the water treatment field service application specialist. These functions will be the responsibility of the mechanical contractor with supervision by the water treatment applications specialist.

b. Be sure that all heating and/or cooling coils are kept open during the cleaning and flushing process and that cleaning solution is re-circulating through them and totally flushed from the entire system. These functions will be the responsibility of the mechanical contractor with supervision by the water treatment applications specialist.

c. After flushing cleaner/metal passivator from the open galvanized system, immediately re- passivate galvanized systems with SANACOR® 2605-WR at 10 gallons/1,000 gallons contained water and leave the passivator in the system to naturally deplete during normal operating blowdown cycles.

d. After flushing cleaner/metal passivator from the open condenser water system, immediately re-passivate these enhanced copper alloy tube systems with SANACOR® 2605-CUI at 10 gallons/1,000 gallons contained water and leave the passivator in the system to naturally deplete during normal operating blowdown cycles.

3. Initial Treatment Closed Loop: As soon as possible after flushing (within two hours), and with clean water in the systems, introduce 800 to 1,200 parts per million of sodium nitrite, pH buffer, yellow metal inhibitor and anti-scalants, (SANACOR® 2301-A) and adjust system water pH to 8.5 - 10.5. Maintain treatment concentration in all closed systems using by-pass feeders; (two-gallon feeders for less than 1,000 gallons contained water and five or twelve-gallon feeder for larger systems.

C. Certification Before Start-Up: Equipment shall not be started until the water sides of all units have been cleaned and treated per these specifications under the supervision of the water treatment company's applications specialist. The field service applications specialist or their designate shall prepare a letter and submit it to the mechanical contractor and/or consulting engineer indicating that all piping systems have been properly cleaned and treated and are ready to be put into operation.

D. Continuation of Supervision: The water treatment service company shall provide supervision of the water treatment program for a period of not less than one year from commencement of the water treatment program which shall consist of analysis of all treated systems and the submittal of a written analytical report stating the current conditions and recommendations for maintaining optimal controls. This service shall be performed monthly or more frequently as specified or required.

END OF SECTION

SECTION 25 0900
DIRECT DIGITAL CONTROL SYSTEM

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS

A. The General Mechanical Provisions, Section 20 01 00, shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE

A. Included: Provide all labor, materials and services necessary for a complete, lawful and operating direct digital control (DDC) system as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:

1. Control panels, control devices, line and low voltage wiring, conduit and related equipment as required for proper operation of all controlled systems.
2. Power wiring required for control devices such as actuators, controllers, sensors and power supplies. Power wiring for these devices shall be fed from circuits dedicated to the DDC system.

B. Work Specified Elsewhere:

1. Line voltage dedicated power circuits for stand-alone building controllers are included in the Electrical Divisions unless otherwise noted.

1.3 CONTRACTOR QUALIFICATIONS

A. All controls shall be furnished and installed by a Contractor who is licensed, certified or contracted by the controls and VRV manufacturer for design, installation, start-up and service of their product. The Contractor must have factory supplied training and support. The Contractor shall have sufficient personnel to respond to a trouble call at the site within four hours. The Contractor's local manager shall have a minimum of five years' experience in the design, installation, start-up and service of similar systems. The Contractor shall submit a list of at least five projects which are similar in size, scope and contract value to this project. This list shall include the Owner's contact person, phone number and controls contract value.

B. Quality Assurance

1. General
   i. The Building Management System (BMS) Contractor shall be Authorized Building Controls Specialist contractor that is regularly engaged in the engineering, programming, installation and service of total integrated Building Management Systems. Bids from wholesalers, distributors or contractors who do not purchase directly from Johnson Controls are not allowed.
   ii. The BMS Contractor shall have a branch facility within a 25-mile radius of the job site supplying complete maintenance and support services on a 24 hour, 7-day-a-week basis. The BMS Contractor shall have at this facility at least eight (8) factory trained, directly employed and full time technical staff, spare parts inventory, and all necessary test and diagnostic equipment.
   iii. As evidence and assurance of the BMS contractor's ability to support the Owner's system with service and parts, the BMS contractor must have been in the BMS business for at least the last ten (10) years and have successfully completed total projects of at least 10 times the value of this contract in each of the preceding five years.
   iv. The BMS architecture shall consist of the products of a manufacturer regularly engaged in the production of Building Management Systems, and shall be the manufacturer's latest standard of design at the time of bid.
2. Workplace Safety and Hazardous Materials
   a. Provide a safety program in compliance with the Contract Documents.
   b. The BMS Contractor shall have a corporately certified comprehensive Safety Certification Manual and a designated Safety Supervisor for the Project.
   c. The BMS Contractor and its employees and subtrades shall comply with federal, state and local safety regulations.

d. The BMS Contractor shall ensure that all subcontractors and employees have written safety programs in place that covers their scope of work, and that their employees receive the training required by the OSHA rules that have jurisdiction for at least each topic listed in the Safety Certification Manual.

e. Hazards created by the BMS Contractor or its subcontractors shall be eliminated before any further work proceeds.

f. Hazards observed but not created by the BMS Contractor or its subcontractors shall be reported to either the General Contractor or the Owner within the same day. The BMS Contractor shall be required to avoid the hazard area until the hazard has been eliminated.

g. The BMS Contractor shall sign and date a safety certification form prior to any work being performed, stating that the Contractors' company is in full compliance with the Project safety requirements.

h. The BMS Contractor's safety program shall include written policy and arrangements for the handling, storage and management of all hazardous materials to be used in the work in compliance with the requirements of the AHJ at the Project site.

i. The BMS Contractor's employees and subcontractor's staff shall have received training as applicable in the use of hazardous materials and shall govern their actions accordingly.

3. Quality Management Program

a. Designate a competent and experienced employee to provide BMS Project Management. The designated Project Manager shall be empowered to make technical, scheduling and related decisions on behalf of the BMS Contractor. At minimum, the Project Manager shall:

◊ Manage the scheduling of the work to ensure that adequate materials, labor and other resources are available as needed.

◊ Manage the financial aspects of the BMS Contract.

◊ Coordinate as necessary with other trades.

◊ Be responsible for the work and actions of the BMS workforce on site.

1.4 BASIS OF DESIGN

A. The system shall be Johnson Metasys Building Systems, without substitution, to match County of Fresno Standard.

1.5 SUBMITTALS AND OPERATION AND MAINTENANCE MANUALS

A. Submittals shall be in accordance with Section 20 01 00 and shall include the following:

1. Contractor qualifications. Manufacturer licenses, contracts or certifications for the installer shall be submitted on manufacturer's letterhead.
2. Manufacturer's data for all devices.
3. Manufacturer's data for all software.
4. Diagrams showing control schematics. Diagrams shall include all sensors, terminal strips, panels and control devices. Locations of all devices shall be indicated.
5. Sequence of operation.
6. Site plan showing conduit trench and pullbox locations. This plan shall also show the conduit termination points inside the buildings.

B. Operation and Maintenance Manuals: Furnish Operation and Maintenance Manuals for all components. These manuals shall contain full documentation which shall include, without being limited to, the following:

1. General description and specifications.
2. Installation and initial checkout procedures.
3. Complete trouble-shooting procedures and diagrams.
4. Complete alignment and calibration procedures for all components.
5. Preventative maintenance requirements.
6. Detailed schematics and assembly drawings.

1.6 SYSTEM ARCHITECTURE

A. The direct digital control system shall employ a multi-level distributed processing architecture. A web based front end controller shall act as the host and shall communicate with both the system operator and the stand-alone controllers. The stand-alone controllers shall be microprocessor based and perform the specified data acquisition and control functions. They shall connect to and supervise multiple application specific controllers (ASC). The stand-alone controllers shall perform stand-alone control functions whether in communications with the web based front end controller or not. All independent control loops shall be processed and controlled by the stand-alone controllers. Each stand-alone controller shall store historical data for all connected points for a minimum of 24 hours. Historical data shall include total run-time for each digital point. For analog data, periodic samples shall be stored at the frequency of once per minute. The physical connection and interface with the actual field points shall be accomplished through the ASC's. The ASC's shall be located throughout the data environment, communicate with, and be controlled by the stand-alone controllers. The stand-alone controllers shall be accessible by laptop computer with proper software via cable connection. Access to the system shall also be available through connection at selected space sensors.

PART 2 - PRODUCTS

2.1 SENSORS

A. Space Temperature Sensor: Room sensor with solid-state electronic, interchangeable with housing appropriate for application occupant and adjustable set point. Occupant adjustable set point shall be limited by software. Wall mounted temperature sensors shall be mounted with bottom of sensor at 48" above finish floor.

B. Outside Air Temperature Sensor: Provide one outside air sensor per stand-alone building controller. Install on north wall of building.

C. Duct Sensor: Averaging sensor shall be used at ducts with greater than 9 square feet of cross sectional area. Sensor shall extend across 75% of the duct. Sensor shall be housed in a NEMA 3R enclosure with proper extension at insulated ducts. Provide access door.

D. Photocell: Wattstopper EM-24 A 2.

E. Status Sensor: Current sensing status sensor with sensitivity adjustment.

2.2 SYSTEM COMPONENTS

A. Electric Actuators:

1. General: Fully modulating, UL listed. Visual position indicator, manual override, spring return. Factory weatherproof enclosure where exposed to weather. Belimo.
2. Valve Actuators: Provide with factory mounting brackets and linkage to the control valve. Capable of shutting off against a 50 psi differential.
3. Damper Actuators: Actuators shall be direct mounted onto the damper control shaft without linkage. Damper actuators shall be sized to provide a minimum of 5 inch-pounds of torque per square foot of damper face area.

B. Lighting Contactors: Contactor with metal enclosure. Square D. Provide low voltage relays to complete the lighting control. For low voltage (120 volt) outside lighting, provide status relay for lighting status. For 277 volt outside lighting, provide current sensor for lighting status.

C. Web Based Front End Controller with Graphical Interface: Provide color graphics accessible through the Owner's system (with security protocol) which will allow the user to override on/off and temperature set points directly. Real time data shall be continuously updated. The minimum graphic screens shall include the following:

1. Site lay-out locations of all equipment being controlled, control component locations and spaces served. Provide multiple screens – minimum of one screen per building, plus site and others as needed for clarity. By selecting the desired equipment item, a flow diagram shall be displayed for the related equipment (as described below). By selecting a conditioned space, a graphic display of the zone conditions shall be displayed (as described below).

2. Flow diagrams shall be provided for each HVAC system, such as air-handling system, chilled water system, hot water system, condenser water system, package unit system with all inputs and outputs dynamically displayed.
3. Each temperature control zone shall have a screen providing set points, temperatures, and related HVAC system status data.
4. Scheduling screens allowing on/off times shall be set for all the following:
    a. Pre-determined individual days
    b. Pre-determined blocks of days (from/to)
    c. Schedules for “Routine” days
    d. Schedules for “Special” days

D. Enclosures: Hinged, lockable front panel. The panel shall be identified with a label as specified. No conduit or other penetration of any kind shall be made on top of the enclosure. If any such entry is made, a plug is not acceptable; replace the enclosure. Hoffman with metal back panel. NEMA 1 for indoor; NEMA 3R for outdoor, NEMA 12 for hazardous locations.

E. Wiring: Sensor and communication cable shall be shielded cable, wire gage and number of wires as recommended by the system manufacturer. Install per manufacturer’s recommendations. No splices will be allowed. Identify both ends at terminal blocks. All wiring that is routed below grade shall have a PVC jacket, CL2-0552. All other wiring shall be plenum-rated, CL3P-0552.

F. Conduit: Size conduit per the California Electrical Code and then increase by one size, except that the minimum conduit size for low voltage shall be 1" and the minimum conduit size for 120 volt power shall be ¾”. For underground conduit, provide 100% spare capacity by installing a second conduit (empty) along all conduit routes.

G. Labels: All labels, signs, etc. shall be engraved, laminated plastic, white on black background, 1/8" high lettering, minimum.

H. Mitsubishi or Daikin Controller. CITY MULTI Controls Network (CMCN) controller with on-site LCD and internet IP accessibility with Factory BACnet Interface Card.

I. Mitsubishi or Daikin Room Sensor/Controller: Shall be wall mounted “in-room” wired remote controller.

2.3 VARIABLE SPEED DRIVE

A. General: The variable frequency drive (VFD) shall be a completely adjustable frequency motor drive system consisting of a pulse width modulated invertor for speed control of NEMA Design B induction motors. Variable frequency drives shall be manufactured by a single source. The VFD manufacturer shall have a minimum of five years experience in VFD design. Asea Brown Boveri (ABB) is the basis of design and shall be used without substitution. Provide factory start-up. Factory start up shall include adjustments to switching frequency and other parameters as required to reduce motor noise at the controlled fan or pump.

B. Standards: VFD shall be in accordance with the latest revisions of the following:
1. IEEE Standard 519, Guide for Harmonic Control and Reactive Compensation for Static Power Converters
2. UL Standard 508, Electrical Industrial Control Equipment
3. VFD shall be UL listed and bear the UL label.

C. Design Requirements: The VFD shall be capable of operating in the following conditions: ambient temperature 0 to 40 degrees C and relative humidity 0 to 95%, noncondensing. The power section shall allow the following faults to occur without damage to the VFD: single-phase fault, three-phase short circuit, or phase to ground short circuit. VFD shall include the following features: overcurrent protection, overspeed protection, over temperature protection, electronic thermal motor protection. NEMA 1 or 4 enclosures, as applicable. Provide line reactors, 3% impedence. Provide load filters for circuit lengths in excess of 200 feet.

D. Adjustments: VFD adjustments shall be set via menu driven selections accessible from the front panel. The VFD shall operate in the auto or manual mode and shall include the following front panel mounted switches and indicators:

1. 2 line x 14 character alphanumeric display
2. Local/ remote switch.
3. Digital indicator of frequency, current, volts, torque, HP, KW, KWhrs and run hrs.
4. Manual speed control
5. Run / stop switch.
6. Power on and run indicator
7. Fault indication including: current limit, overvoltage, undervoltage, overload or thermal motor protection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: A dedicated ASC shall be provided for every item of new equipment and for every item of existing equipment. All electrical work shall be in accordance with the California Electrical Code and the Electrical Specification Sections. Wiring shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed wiring shall run in conduit parallel to room surfaces; location shall be approved by the Engineer. Wiring in walls or in mechanical rooms, janitor rooms, or storage rooms shall be in conduit. Conduit above roofs shall be rigid conduit. Low voltage wiring in accessible attics may be run without conduit. This wiring shall be strapped to structure at 48” on center, and shall not lay on the ceiling. No structural member shall be weakened by cutting, notching, boring or otherwise. Provide power wiring for each device requiring external power. Dedicated circuits shall be provided for devices as required by the manufacturer. Devices or wiring exposed to the weather shall be protected in NEMA 3R enclosures and weatherproof conduit. All conduit shall include a pull wire. Set, test, and adjust the system for proper operation. Provide connection to the Owner’s network for web-based access to stand-alone controllers.

B. Programming: The Contractor shall be responsible for programming the system and shall coordinate the scheduling (on/off times) with the Owner. All point lists and programming blocks shall be provided by the Contractor. For upgrades or additions to existing systems, all existing programming and existing sequences of operation shall be incorporated into the new system and equipment. The project will not be considered complete until all programming and graphics have been completed and all systems are operational from the location of the web based front end controller.

C. Control Panels/Enclosures:

1. ASC’s, transformers, relays, etc. shall be housed in enclosures. Enclosures shall be installed as shown on plans. Wherever practical, do not locate enclosures above ceilings. Maintain access to enclosures that are located above ceilings (e.g. at VAV boxes).
2. For all enclosures, provide a disconnect switch and an in-line fuse. All wiring shall be terminated at terminal strips – no wire nuts. Provide a plastic covered wiring diagram in each enclosure. All wiring (field and inside enclosures) shall be labeled at both ends with machine printed markers – black on white tape. At packaged equipment, locate the enclosure on the side of the unit without obstructing access or service clearance.
3. Separate 120-volt circuits from low voltage circuits horizontally. A physical barrier is not required. Enclose wiring within the enclosure in 2”x2” Panduit.

3.2 TRAINING

A. Prior to final acceptance, the Contractor shall provide operational training to the Owner's personnel. The training sessions shall include a complete demonstration of the system. Dates and times of the training sessions shall be coordinated through the Owner not less than one week prior to session. A total of 40 hours of instruction shall be provided - 20 hours initially, and 20 hours to be spread throughout the first year of operation. The Contractor shall maintain

a log of training sessions including dates, times and names/titles of those attending. The Contractor shall submit a copy of this log on request.

3.3 TESTING AND ACCEPTANCE

A. The Contractor shall verify, in the presence of the Owner, the system accuracy and proper function of each controlled device and sensor. The following items shall be successfully demonstrated prior to acceptance by the Owner:

1. All system outputs including controllers, relays, and other control devices shall be addressed and start/stop functions demonstrated.
2. All inputs shall be displayed and all event-initiated functions shall be demonstrated.
3. Demonstrate program integrity and power restore sequence during and after a power failure and restoration.
4. Deliver all record drawings, wiring diagrams, equipment specifications, operation and maintenance manuals and other documentation as required to describe the system.
5. Complete operator training in the use, programming, and operation of the system.

3.4 SERVICE WORK

A. Service work shall be performed by service personnel in the direct employ of the controls contractor. The service technicians shall be factory trained and certified by the manufacturer to be competent in all aspects of the installed system. The technician shall have a working knowledge of calibration techniques, preventive maintenance, troubleshooting, software diagnostics and microprocessor repair. Precaution shall be taken to minimize disruption of facility operations by service work.

3.5 SEQUENCE OF OPERATION

A.

END OF SECTION

SECTION 26 00 00 GENERAL ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes general requirements specifically applicable to Divisions 26, 27, & 28; including requirements form Division 1.

1.2 RELATED SECTIONS

A All included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Standards
  1 AEIC – Association of Edison Illuminating Companies
  2 ANSI – American National Standards Institute
  3 ASTM – American Society of Testing and Materials
  4 CBM – Certified Ballast Manufacturers Association
  5 EIA – Electronic Industry Association
  6 ICEA – Insulated Cable Engineers Association
  7 IEEE – Institute of Electrical and Electronics Engineers
  8 NEMA – The Association of Electrical and Medical Imaging Equipment Manufacturers
  9 FM - Factory Mutual
  10 UL – Underwriter's Laboratory's, Inc., Standards for Safety
B Local codes and authorities having jurisdiction
  1 City codes
  2 County codes
  3 Local fire department
C State codes and authorities having jurisdiction
  1 CBC – California Building Code
  2 CEC – California Electrical Code
  3 State of California Codes
D National codes and authorities having jurisdiction
  1 NESC – National Electrical Safety Code
  2 OSHA – Occupational Safety and Health Act
E Utilities
  1 Local cable company
  2 Local electrical company
  3 Local telephone company
F Code compliance
  1 All work and materials shall comply with the latest rules, codes and regulations, including, but not limited to the following:

a Occupational Safety and Health Act Standards (OSHA).
b CCR, Title 24, Part 3: California Electrical Code (CEC)
c All other applicable Federal, State and Local laws and regulations.

2 Code compliance is mandatory. Nothing in these Drawings and Specifications permits work not conforming to National, State, and Local electrical and building codes. Where work is shown to exceed minimum code requirements, comply with Drawings and Specifications.

3 No work shall be concealed until after inspection and approval by proper authorities. If work is concealed without inspection and approval, the Contractor shall be responsible for opening the concealed areas, making any required corrections and/or modifications to his work, and restoring the area to its previous condition.

1.4 DEFINITIONS (APPLICABLE TO DRAWINGS AND SPECIFICATIONS)

A Provide: To supply, install and connect complete and ready for safe and regular operation of particular work referred to unless specifically otherwise noted.

B Install: To erect, mount and connect complete with related accessories.

C Supply: To purchase, procure, acquire and deliver complete with related accessories.

D Work: Labor, materials, equipment, apparatus, controls, accessories and other items required for proper and complete installation.

E Wiring: Raceway, fittings, wire, boxes, related items and connection.

F Concealed: Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

G Exposed: Either visible or subject to mechanical or weather damage, indoors or outdoors, including areas such as mechanical and storage rooms. In general, any item that is directly accessible without removing panels, walls, ceiling or other parts of structure.

H Indicated, Shown, or Noted: As indicated, shown or noted on Drawings or Specifications.

I Above Grade: Not buried in ground and not embedded in concrete slab on ground.

J Below Grade: Buried in ground or embedded in concrete slab on ground.

K Underground: Buried in ground, including under building slabs.

L Connect: Complete hookup of item with required services, including conduit, wire and other accessories.

M Furnish: Supply and deliver complete.

N Similar or Equal: Of base bid manufacturer, equal in materials, weight, size, design, and efficiency of specified product, equivalent to Base Bid Manufacturer's product.

O Reviewed, Satisfactory, Accepted, or Directed: As reviewed, satisfactory, accepted or directed by or to engineer.

P Motor Controllers: Manual or magnetic starters (with or without switches), individual pushbuttons, or hand-off-automatic (HOA) switches controlling the operation of motors.

Q Control Devices: Automatic sensing and switching devices such as thermostats, pressure, float, electro-pneumatic switches and electrodes controlling operation of equipment.

R Contractor: Electrical Sub Contractor unless stated otherwise.

S Use (verb): Furnish and install as defined above.

1.5 LICENSES, FEES AND PERMITS

Pay for all City, County or State electrical licenses, fees and permits. Arrange for all required inspections by agencies or authorities having local jurisdiction. The owner shall pay for all inspection fees and permits.

1.6 CONDITIONS AT SITE

A A visit to the 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 Underground or overhead lines or other services that are damaged as a result of this work shall promptly be repaired at no expense to the Owner and to complete satisfaction of the Owner.

1.7 DRAWINGS AND SPECIFICATIONS

A All Drawings and all Divisions of these Specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division.

B The Contract Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduit and wiring is not assured. Exact requirements shall be governed by architectural, structural and mechanical conditions of the job. Consult all other Drawings in preparation of the bid. Extra lengths of wiring or addition of pull or junction boxes, etc., necessitated by such conditions shall be included in the bid. Check all information and report any apparent discrepancies before submitting bid.

C Right is reserved to make change up to ten (10) feet in location of any outlet, device, or equipment prior to roughing in without increasing contract cost.

D Equipment and fixtures shall be connected to provide circuit continuity in accordance with applicable codes, whether or not each piece of conductor, conduit or protective device is shown between items of equipment or fixtures and the point of circuit origin.

1.8 SAFETY AND INDEMNITY

A Safety: The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours.

B No act, service, Drawing review or construction review by Owner, the Architect, the Engineers or their Consultants, is intended to include review of the adequacy of the Contractor's safety measures, in on or near the construction site.

1.9 RECORD DRAWINGS

A Submit record Drawings under provisions of Section 013000.

B Submit prior to final acceptance inspection, one complete marked-up set of reproducible engineering design Drawings.

1 Fully illustrate revisions made by crafts in course of work.

2 Include field changes, adjustments, variances, substitutions and deletions, including Change Orders.

3 Indicate exact location of raceways, equipment, and devices.

4 Indicate exact size and location of underground and under floor raceways, grounding conductors, and duct banks.

5 The record Drawings shall show all the work actually constructed and originally shown on the Drawing based upon the field construction by the Contractor.

C These Drawings shall be for record purposes for Owner's use and are not considered Shop Drawings.

1.10 MANUFACTURER'S INSTRUCTIONS

A Where the Specifications call for an installation to be made in accordance with manufacturer's recommendations, a copy of such recommendations shall at all times be kept in the job superintendent's office and shall be available to the Owner's representative.

B Follow manufacturer's instructions where they cover points not specifically indicated on Drawings and Specifications. If they are in conflict with the Drawings and Specifications, obtain clarification from the Architect or Engineer before starting work.

C One (1) set of equipment manufacturer's Drawings shall be submitted to the Engineer for their record.

1.11 OPERATING AND MAINTENANCE MANUALS

A Operating and maintenance manuals and close-out documents are used interchangeably

B Submit operating and maintenance manuals of equipment in the following format. Owner shall decide which format they prefer.

1 Three (3) hardcopy sets

2 PDF format

C For specific requirements, see the sections in which the equipment is specified.

1.12 QUALITY ASSURANCE

A Provide a meaningful quality assurance program. To assist the Contractor in this program, the Specifications contained herein are set forth as the minimum acceptable requirements. This does not relieve the Contractor from executing other quality assurance measures to obtain a complete operating facility within the scope of this project.

B The Contractor shall insure that workmanship, materials employed, required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.

1.13 GUARANTEE

Guarantee the installation free from defects of workmanship and materials for a period of one (1) year after Date of Certificate of final payment and promptly remedy any defects developing during this period, without charge.

1.14 BIDDING

A The contractor shall bid on the plans, specifications, etc. that constitute the contract documents.

B The contractor shall not attempt to modify the contract documents without the approval of the electrical engineer.

C All “value engineering” proposals shall be submitted in to the electrical engineer writing.

D If the contractor makes changes to the contract documents not approved by the electrical engineer, the contractor will still be responsible for installing all devices, conductors, conduits, etc. the contract documents call for.

1.15 ABBREVIATIONS

AIC	Amps interrupting capability
ANSI	American National Standards Institute
ASTM	ASTM International, formerly American Society for Testing and Materials
ATC	Astronomical time clock
ATS	Automatic transfer switch
CAD	Computer aided design
CATV	Cable television
CBC	California Building Code
CCTV	Closed circuit television
CEC	California Electrical Code
CFC	California Fire Code
CFR	Code of Federal Regulations
CMC	California Mechanical Code
CPC	California Plumbing Code
CSFM	California State Fire Marshal
DPDT	Double pole, double throw
DPST	Double pole, single throw
DVR	Digital video recorder
EIA	Electronic Industries Association
EMT	Electrometallic conduit
EOR	Engineer of record
EPA	Effective projected area
FACP	Fire alarm control panel
FMC	Flexible metallic conduit
GRS	Galvanized, rigid steel conduit
HVR	Hybrid video recorder
ICC-ES	International Code Council Evaluation Service
IDF	Intermediate data frame
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society of North America
IMC	Intermediate metallic conduit
I/O	Input/output
IOR	Inspector of record
IP	Internet protocol
ISO	International Organization for Standardization
LAN	Local area network
LCD	Liquid crystal display
LCP	Lighting control panel/lighting relay panel
LED	Light emitting diodes
LPI	Lightning Protection Institute
MDF	Main data frame
NEC	National Electrical Code
NEMA	Association of Electrical Equipment and Medical Imaging Manufacturers
NETA	National Electrical Testing Association
NFPA	National Fire Protection Association

NIST	National Institute of Standards and Technology
OCPD	Overcurrent protection device
PDF	Portable document format
PG&E	Pacific Gas and Electric
PTZ	Pan, tilt, zoom
SCCR	Short circuit current rating
SPD	Surge protective device
SPDT	Single pole, double throw
SPST	Single pole, single throw
THD	Total harmonic distortion
TIA	Telecommunications Industries Association
UL	Underwriters' Laboratories
USB	Universal series bus
UPS	Uninterruptable power supply
VFD	Variable frequency drive
VOIP	Voice over Internet protocol
VPN	Virtual private network
WAN	Wide area network

PART 2 – PRODUCTS

2.1 MATERIAL APPROVAL

A. All materials must be new and bear Underwriters' Laboratories label. Materials that are not covered by UL testing standards shall be tested and approved by an independent testing laboratory or a governmental agency.

B. Material not in accordance with these Specifications may be rejected either before or after installation.

C. Materials or equipment specified by:

1. Name of manufacturer.
2. Brand or trade name.
3. Catalog reference.

2.2 SUBSTITUTIONS

A. Base the bid on use of materials specified.

B. Equipment other than specified will be considered for approval provided it meets previous items A through C and the following is submitted in writing by the Contractor to the Engineer to allow approval at least 14 days before the bid date:

1. The request for permission to substitute shall be accompanied with a statement of the amount of money to be returned to the contract if the substitution is permitted.
2. Return a completed request for substitution form.

C. The engineer is the sole judge of acceptability of preferred substitutions.

D. If a substitute is permitted, and any re design effort is thereby necessitated, the required re design shall be at the Contractor's expense.

2.3 SUBMITTALS

Submit to architect, or engineer if no architect is involved, seven (7) copies of complete Shop Drawings and materials lists, as noted below, for review within thirty (35) days after award of contract. All proposed deviations from Specifications must be clearly listed and submitted separately under a prominent heading entitled "Substitutions."

A Fire Alarm Systems
B Communication Systems
C Pull Boxes and Cabinets
D Conduit and Wire
E Service and distribution
F Transformers

2.4 OPERATING AND MAINTENANCE MANUALS

Submit Operating and Maintenance Manuals of equipment as specified under Division 1. Verify exact quantity with architect, or engineer if no architect is involved.

2.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A Equipment shall be shipped in its original packages, to prevent damaging or entrance of foreign matter. Handling and shipping shall be performed in accordance with manufacturer's recommendations. Provide protective covering during construction.
B Replace at no expense to Owner, equipment or material damaged during the storage or handling, as directed by the engineer.
C Equipment shall be tagged with a weatherproof tag identifying equipment by name and purchase order number. Packing and shipping lists shall be included.

PART 3 – EXECUTION

3.1 CLEARANCE

Minimum code required clearances for electrical equipment shall not be violated.

3.2 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

A Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work.
B The Electrical Contractor shall provide a Superintendent in charge of this work at all times to direct the quality of the installation.

3.3 COORDINATION

A Coordinate work with other trades to avoid conflict and to provide correct rough in and connection for equipment furnished under other trades and requiring electrical connections. Inform Contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.
B Verify equipment dimensions and requirements with provisions specified under this Section. Check actual job conditions before fabricating work. Report necessary changes

in time to prevent needless work. Changes or additions subject to additional compensation and agreed price shall be at Contractor's risk and expense.

C Provide temporary feeds and connections to areas and equipment as required to allow phased construction and operation.

3.4 CUTTING AND PATCHING

All cutting and patching required for work of this Division is included herein. Coordination with General Contractor and other trades is imperative. Contractor shall bear the responsibility for and bear the added expense of adjusting for improper holes, supports, etc.

END OF SECTION

SECTION 26 05 00 BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for the following:

A Conduit and raceways
B Wire and cables
C Outlet boxes
D Junction boxes
E Pull boxes
F Grounding

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

Published specification standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A American Society for Testing and Materials
  1 ASTM B3: Standard Specification for Soft or Annealed Copper Wire
  2 ASTM B33: Standard Specification for Tin-Coated or Annealed Copper Wire for Electrical Purposes
  3 ASTM B738: Standard Specification for Fine-Wire Bunch-Stranded and Rope-Lay Bunch-Stranded Copper Conductors for Use as Electrical Conductors
  4 ASTM B355: Standard Specification for Nickel-Coated, Soft or Annealed Copper Wire
  5 ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
B California Electrical Code (CEC)
C Institute of Electrical and Electronic Engineers (IEEE)
  1 IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements
  2 IEEE 82: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors

3 IEEE 95: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors
4 IEEE 141: Recommended Practice for Electric Power Distribution for Industrial Plants
5 IEEE 142: IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems
6 IEEE 241: Recommended Practice for Electric Power Systems in Commercial Buildings
7 IEEE 242: Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book)
8 IEEE 399: Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book)
9 IEEE 442: Guide for Soil Thermal Resistivity Measurements
10 IEEE 576: Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications
11 IEEE 1185: Recommended Practice for Cable Installation in Generating Stations and Industrial Facilities
12 IEEE 1584: Guide for Performing Arc Flash Hazard Calculations
13 IEEE 1584a: Guide for Performing Arc-Flash Hazard Calculations--Amendment 1
14 IEEE 1584b: Guide for Performing Arc-Flash Hazard Calculations--Amendment 2: Changes to Clause 4

D Underwriters' Laboratories
1 UL 1: Flexible Metal Conduits
2 UL 4: Armored Cable
3 UL 6: Electrical Rigid Metal Conduit – Steel
4 UL 13: Power Limited Circuit Cables
5 UL 83: Thermoplastic Insulated Wires and Cables
6 UL 310: Electrical Quick-connect Terminals
7 UL 360: Liquid Tight Flexible Steel Conduit
8 UL 444: Communications Cables
9 UL 467: Grounding and Bonding Equipment
10 UL 486A: Wire Connectors
11 UL 486B: Wire Connectors
12 UL 486C: Splicing Wire Connectors
13 UL 486D: Sealed Wire Connector Systems
14 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
15 UL 493: Thermoplastic Insulated Underground Feeder and Branch Circuit Cables
16 UL 510: Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
17 UL 514A: Metallic Outlet Boxes
18 UL 514B: Conduit, Tubing, and Cable Fittings
19 UL 514C: Nonmetallic Outlet Boxes, Flush-device Boxes, and Covers
20 UL 514D: Cover Plates for Flush-mounted Wiring Devices
21 UL 568: Nonmetallic Cable Tray System
22 UL 635: Insulating Bushings
23 UL 651: Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
24 UL 797: Electrical Metallic Tubing – Steel
25 UL 854: Service Entrance Cables
26 UL 870: Wireways, Auxiliary Gutters, and Associated Fittings
27 UL 969: Marking and Labeling Systems

28 UL 1242: Standard for Electrical Intermediate Metal Conduit - Steel
29 UL 1332: Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment
30 UL 1446: Systems of Insulating Materials – General
31 UL 1479: Fire Tests of Through Penetration Firestops
32 UL 1565: Position Devices (includes cable ties and clamps)
33 UL 1581: Reference Standard for Electrical Wires, Cables, and Flexible Cords
34 UL 1652: Flexible Metallic Tubing
35 UL 1685: Vertical-tray Fire Propagation and Smoke Release Test for Electrical and Optical Fiber Cables
36 UL 1773: Standard for Termination Boxes
37 UL 1977: Component Connectors for Use in Data, Signal, Control, and Power Applications
38 UL 2024: Standard for Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies
39 UL 2196: Test for Fire Resistive Cables
40 UL 2239: Hardware for the Support of Conduit, Tubing, and Cable
41 UL 2256: Nonmetallic Sheathed Cable Interconnects
42 UL 2257: Identification Tests for Jacket and Insulation Materials Used in Plenum Cables
43 UL 2277: Flexible Motor Supply Cable and Wind Turbine Tray Cable
44 UL 2459: Insulated Multi-pole Splicing Wire Connectors
45 UL 2556: Wire and Cable Test Methods

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Deliver, store and protect products under provisions of Section 016000.
F Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
G Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
H Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials

3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 Calibration procedures and intervals
7 A complete set of drawings for any special items
8 Wiring diagrams

C Electronic submittals shall be searchable

D Seismic Restraint and Anchorage: Provide complete seismic anchorage and bracing for the lateral and vertical support of conduit and electrical equipment in accordance with CBC, Title 24, Part 2, Section 1616A.1 and ASCE 7-10 Section 13.6, and all provisions of this Section.

1 Submit calculations prepared and signed by a Structural Engineer licensed in the State of California, showing compliance with the above for all electrical equipment weighing more than 50 pounds, excepting items corresponding exactly in configuration and weight to those specified and detailed. Where anchorage details are not shown on drawings, the field installation shall be subject to the approval of the Electrical Engineer.
2 All equipment mounted on concrete shall be secured with post-installed concrete requiring a drilled hole. Power driven anchors are not acceptable. Minimum spacing shall be 10 diameter center to center and 5 diameters center to edge of concrete. Maximum allowable loads for tension and shear shall be as determined in compliance with ACI 318-14 Chapter 17 and the anchor's ICC or IAPMO evaluation report. Acceptable manufacturers are Hilti, Red Head, and Simpson Strong Tie.
3 Conduit and suspended equipment shall be provided with supports and seismic restraints in accordance with Unistrut, Inc. Seismic Bracing Guide, or Super Strut Inc., Seismic Restraint System guide. Support requirements shall e based upon similar equipment; i.e., water piping as equivalent to conduit with wire fill. A copy of the guide shall be on the job site during construction.

E The submittal shall be substantially complete for all items and equipment furnished under this section.

F Individual drawings and data sheets submitted at random intervals will not be accepted for review.

G Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.

B The manuals shall, at minimum, include the following:

1 Table of contents
2 Manufacturer (including contact information)
3 Model number
4 Voltage ratings
5 Current ratings
6 List of capabilities
7 Environmental ratings
8 NEMA enclosure type
9 Maintenance instructions and intervals
10 Calibration procedures and intervals

11 Installation instructions
12 Repair instructions (where applicable)
13 As-built drawings

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 CONDUIT AND OTHER RACEWAYS

A Rigid Conduit, also referred to as Galvanized Rigid Steel Conduit (GRS)
1 Material: High strength steel
2 Coating
a All uses: hot-dipped galvanized
b Underground or corrosive areas
1 40-mil, UV stabilized PVC coated
2 Coating shall conform to NEMA RN-1
3 Fittings shall be threaded.
4 Conduit shall be UL-6 listed.

B Intermediate Metal Conduit (IMC)
1 Material: Steel
2 Coating
a All uses: hot-dipped galvanized
b Underground or corrosive areas
1 40-mil, UV stabilized PVC coated
2 Coating shall conform to NEMA RN-1
3 Conduit shall be UL-1242 listed.

C Electrical Metallic Tubing (EMT)
1 Material: Steel
2 Coating
a All uses: hot-dipped galvanized
b Underground or corrosive areas
1 40-mil, UV stabilized PVC coated
2 Coating shall conform to NEMA RN-1
3 Fittings shall be threaded.
4 Connectors and couplings
a Water tight, steel compression type exterior and in wet locations. Use ETP Fittings InspectoRidge or approved equal when possible.
b Steel set screw type in interior, dry locations.

D Non-metallic conduit
1 Conduit shall be schedule 40 PVC (minimum)
2 Approved for use as non-metallic raceway with 90°C conductors
3 Comply with NEMA TC-2 and NEMA TC-3

E Flexible Metallic Conduit
1 Material: High strength, hot-dipped galvanized steel
2 Construction: Interlocked
3 Conduits in damp, wet, or corrosive areas shall be liquid tight type with PVC jacket extruded over the steel conduit.

F Fittings and accessories

1 Fittings and accessories for all conduit types shall be approved for the purpose and equal in all respects to the conduit or raceway.
2 Fittings and accessories for metallic conduits shall be made of ferrous metal and galvanized after fabrication.

G Pull lines
1 Pull line shall be 1/8 inch diameter, yellow color.
2 Pull lines shall be Tubbs Cordage "Polyline" or approved equal.

H Wireways
1 NEMA type
a NEMA-1 for dry locations
b NEMA-3R or NEMA-4 for damp and wet locations
c NEMA-4X for corrosive locations
2 Metal type
a Non-corrosive locations: mild steel
b Corrosive locations: stainless steel
3 Thicknesses
a 6”x6” cross-section and smaller: 16 gauge
b 8”x8” cross-section and larger: 14 gauge
4 Finish: The entire enclosure shall be finished as follows:
a Degreasing
b Cleaning
c Phosphatizing
d Electrostatic deposition of polymer polyester powder coating followed by baking to produce a hard durable finish.
1 The average thickness of the paint film shall be 2.0 mils.
2 Paint film shall be uniform in color and free from blisters, sags, flaking and peeling
e Finish shall conform to UL 50 and UL 50E.
f Color shall match surrounding area.
5 Covers
a Wireways shall have hinged covers.
b NEMA 3R, 4 and 4X wireways shall be a gasket on the inside of the cover to seal the wireway when cover is closed.
c Covers shall have latches to secure the cover in the closed position.
6 Wireways shall be UL listed.

I Raceways shall be UL listed.

2.2 WIRE AND CABLE

A Conductors for power and lighting systems 600V or less:
1 Conductors shall be 90°C rated.
2 Conductors size #12 AWG and larger shall be stranded copper.
3 Type:
a THWN for wet or underground locations
b THHN for dry locations.
c 90°C rated
4 Minimum conductor size for voltage drop:
a Minimum size #12 AWG for runs 50 feet or less for 208/120V systems or 100 feet or less for 480/277V systems
b Increase conductor by one size by one method below:

1 For each additional 50 feet for 208/120V systems or 100 feet for 480/277V systems.
2 Calculate voltage drop and size as directed by CEC Voltage Drop Restrictions.

c Underground circuits shall be #8 AWG minimum wire, unless otherwise noted.

d Once the contractor has determined conductors' route, calculate the minimum size to meet maximum voltage drop allowed per CEC using $D_{min}=C*L*I/(V_D*N)$.
1 D_{min} is the minimum diameter (circular mills)
2 C=24 for copper, C=39 for aluminum
3 L is conductor length (feet)
4 I is the current (amps)
5 V_D is the maximum allowable voltage drop (volts)
6 N is the quantity of parallel conductors per phase

5 Minimum size conductors for OCPD shall be determined from CEC Table 310.16 with ampacity corrected for 115°F.

6 Conductor size shall the largest size to meet maximum voltage drop (2.2 A 4) and to meet CEC ampacity requirements (2.2 A 5).

B For Signal and Communication Circuits:
1 Special Cables: As specified on Drawings.
2 Conductors for general communications use: Stranded copper conductor, #16 AWG minimum, with THWN insulation for underground or wet locations and THHN insulation for dry locations.
3 Ends of stranded conductors shall be tinned.

2.3 OUTLET BOXES, JUNCTION BOXES, AND PULL BOXES

A Above ground locations
1 Outlet Boxes
a Hot-dipped galvanized after fabrication
b Of required size, minimum 4 inches square, for flush mounted devices and lighting fixtures
c Cast type with gasketed covers for outdoor or wet locations.
d Device and fixture back boxes shall be 2-1/4" deep, minimum.
2 Junction and Pull Boxes
a Use outlet boxes with appropriate covers as junction boxes wherever possible.
b Larger junction and pull boxes
1 Sheet steel, hot dipped galvanized after fabrication, finished gray baked enamel
2 Sized according to code
3 Screw-on covers.

B In-ground pull boxes, handholes, and manholes
1 Precast concrete type with required extension collars.
2 Covers
a Lids shall be steel or reinforced concrete, as shown on plans. Pull box lids in traffic areas or large grassy areas subject to mowing by riding mowers shall traffic rated.
b Covers shall include hold down bolts.
c Top of cover shall be flush with top of box.

d Covers shall be identified as ELECTRICAL, SIGNAL, or COMMUNICATIONS unless otherwise specified.

3 Size boxes as indicated on Drawings. If size is not indicated on Drawings, use CEC as a minimum requirement.

4 Boxes shall have 2" thick (minimum), reinforced concrete bottoms with 1" diameter drain hole over 12" of crushed rock.

5 Boxes shall have approved cable supports.

6 Concrete encased stubs for handholes extending five (5) feet beyond handhole.

7 All pull boxes shall be no smaller than a Christy N-9.

8 All pull boxes shall be set flush to finished grade and shall have an 8-inch wide by 3-inch thick concrete mow strip poured around it.

9 Manufacturer shall be Brooks Products, Oldcastle Enclosure Solutions (Christy), Jensen Precast, or approved equal.

10 All sections between box, extension rings, etc. and penetrations shall be sealed with mortar.

C Floor Boxes

1 Provide Walker or equal Modulink non-metallic floor box for concrete areas.

2 Provide quantity of boxes required to accommodate each device.

3 Provide Walker Wood Floor Boxes at wood floors provide quantity required to accommodate each device.

4 Provide brass flip cover lids.

D Outlet boxes, junction boxes, pull boxes, etc. recessed in a concrete wall shall be deep masonry boxes.

2.4 CONDUIT AND EQUIPMENT SUPPORTS

A Conduit supports

1 For Individual conduit runs not directly fastened to the structure: Rod hangers

2 For multiple conduit runs: Trapeze type conduit support designed for maximum loading deflection not exceeding manufacturer's recommendations.

B Materials

1 All materials not otherwise noted:

a Steel with the finished part hot dipped galvanized

b Stainless steel for corrosive or damp environments

2 All bolts and nuts shall be stainless steel.

C Supports anchored to earth shall be anchored in a concrete base per details.

D Manufacturers shall be Caddy, Unistrut, Powerstrut, or approved equal.

E All exposed channels shall have end caps made by the channel manufacturer and designed for use with the channel.

2.5 WIRE CONNECTORS

A For wire size #8 AWG and smaller: Insulated, screw type, rated 105°C, 600V for building wiring and 1000V for fixtures; Scotchlok, Ideal, or approved equal.

B For wire size #6 AWG and larger: T&B or approved equal screw type with 3M "#33+" or Plymouth "Slipknot Gray" tape insulation.

C Underground wire splices

1 Connect ends of conductors with copper compression connectors, 3M Scotchlok or approved equal.

2 Seal splice with inline resin splice kit approved for weather exposure, direct burial, and wet locations, 3M Scotchcast or approved equal.

D Only set screw, compression type connectors may be used for MC cables. Fish hook/open tang connectors are prohibited.

2.6 GROUNDING

A Ground Rods
1 3/4 inch diameter
2 Copper weld type
3 10 feet in length.

B Ground Wire: Conductors shall be medium-hard drawn, copper, and stranded, with sizes as shown on drawings.

C Utilize CADWELD Multi-System Exothermic Welding for below grade ground connections.

D Bolts, nuts, and washers shall be bronze, cadmium plated steel, or other corrosion resistant material approved for the purpose.

2.7 MISCELLANEOUS MATERIALS

A All screws, bolts, nuts, and washers on equipment outdoors or in wet or corrosive environments shall be stainless steel.

2.8 SEALANTS

A General purpose sealant: One part polysulfide or polyurethane, Federal Standard TT-S-00230c or two-part polyurethane, Federal Standard TT-SS-227E of Mameco Vulkem 116 or 227 or approved equal product manufactured by Products Research and Chemical Corporation. Pecora, Sika, Sonneborn, or Tremco may be substituted under provisions of Section 016000.

B Conduit sealant
1 Two part, self curing urethane
2 Non-sagging
3 Liquid and gas tight
4 Chemically stable once cured
5 Compatible with conduit and conductor materials
6 Designed for use as conduit seal

C Fire retardant sealant: Dow Corning Company, Type 3-6548 silicone RTV foam sealant, closed cell, 18 lb. density, 2-part system with UL certification. Type 96-081 one-part sealant shall be used for small spaces and cracks. 3M Fire Barrier Caulk CP25 is also acceptable.

2.9 IDENTIFICATION

A Nameplates:
1 White, acrylic plastic suitable for indoor or outdoor use
2 Face colored as below with engraved, white, 3/16” minimum, Arial or similar font characters
a Equipment on normal systems: Black face
b Equipment on emergency systems: Red face
3 Clear plastic overlay suitable for indoor or outdoor use that can be replaced if vandalized.
4 Sign shall include device name, voltage, and size.

5 Outdoor nameplates shall be UV stable and fade resistant.

B Pull line identification tags:
1 Aluminum plate
2 1/8” tall (minimum), Arial (or similar) font, identifying text stamped on plate
3 Tags shall describe conduit’s length, source, and destination.

PART 3 – EXECUTION

3.1 GENERAL

A Electric system layouts indicated on the Drawings are generally diagrammatic but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of cable and wiring and the locations of outlets by the structure and equipment served. Dimensions shall be taken from Architectural Drawings.

B Consult all other Drawings. Verify scales and report any dimensional discrepancies or other conflicts to architect, or engineer if no architect is involved, before submitting bid.

C Home runs to panelboards are indicated as starting from the outlet nearest the panel and continuing in the general direction of that panel. Continue such circuits to the panel as though the routes were completely indicated. Terminate homeruns of signal, alarm, and communications system in a similar manner.

D Avoid cutting and boring holes through structure or structural members wherever possible. Obtain prior approval of Architect and conform to structural requirements when cutting or boring the structure is necessary or permitted.

E Furnish and install necessary hardware, hangers, blocking, brackets, bracing, runners, required for equipment specified under this section.

F Provide necessary backing required to insure rigid mounting of outlet boxes.

G Install pull line in all conduits to remain that will have their conductors removed.

3.2 INSTALLATION OF CONDUIT

A Run conduit concealed unless otherwise noted or shown on Drawings.

B Run exposed conduit parallel to or at right angles to center lines of columns and beams.

C Run no conduit in concrete slabs or floors except at point of penetration. Penetrations shall be at right angles to slab surfaces.

D Install conduit above ceilings to avoid obstructing removal of ceiling tiles, lighting fixtures, air diffusers, etc.

E Conduit shall not cross any duct shaft or area designated as future duct shaft. Coordinated with mechanical work to avoid any conflict.

F Install pull line in empty conduit installed under this contract. Provide and install labels as describe in “Identification” sub-section.

G Spare conduits shall be capped to prevent intrusion of moisture and foreign objects.

H Minimum conduit size shall be 1/2 inches when installed above ground and 3/4 inches when installed underground or under building slabs. Increase conduit size as required for wiring. Size for conduit, unless specifically shown otherwise, shall be determined from Table 3 for all conductors, Chapter 9 of latest National Electric Code.

I Conduit shall be rigid conduit, IMC, EMT, or plastic as follows:
1 Above ground and dry locations: Use rigid conduit, IMC or EMT.
a Wet locations: Rigid conduit, IMC.
b Locations subject to mechanical injury: Rigid conduit or IMC only.
c In concrete walls or block walls: Rigid steel conduit or IMC only.

d Dry locations and not subject to mechanical injury: EMT (interior locations only), IMC, or rigid conduit.

2 Underground: Use wrapped rigid steel or plastic.

a Schedule 40 PVC: For use underground where protected by concrete slabs, asphaltic pavement, or concrete walkways. Use steel elbows for plastic conduit runs penetrating floor slabs. Bends in plastic conduit other than normal long sweeps shall be made only with factory formed ells or curved segments. Heat bending may not be used. Sections of rigid steel conduit runs are required where direction changes. In all cases where use of plastic conduit is allowed or specified, Contractor may, at his option, use rigid steel conduit.

b Underground conduits shall have red 4” wide identifying caution tape reading "CAUTION ELECTRICAL LINE BELOW”, length as required and installed 12” above all conduits runs.

c Do not install plastic conduit in rock base.

d Underground conduit entering building shall be provided with one (1) 10 foot section of rigid steel conduit at point of penetration of foundation, footing or basement wall, with approximately equal lengths inside and outside building line, unless otherwise noted.

3 Bends

a Make risers to grade with rigid steel long radius sweep conduit and rigid steel elbow fittings only.

b Minimum radius of sweeps shall be 24 inches.

J Burial depth of conduit shall be as follows:

1 Concrete encased: 24 inch minimum for 600V or lower systems to top of concrete encasement.

2 Conduit without concrete encasement or cap: 24 inch minimum to top of conduit.

3 When installed under buildings, the above minimum depth shall be 18 inches below bottom of floor slab.

K Use flexible steel conduit in the following applications:

1 Recessed lighting fixtures.

2 Motor connections.

3 Connection between fan plenum and structure.

4 At expansion joints.

5 At transformers and other equipment which produce vibration.

L Provide junction boxes/pull boxes as required to limit any power system conduit run to a maximum of four (4) 90 degree bends (two (2) 90 degree bends for signal communication system conduit runs) or to avoid "U" bends.

M Conduit Supports:

1 Support conduit with Underwriters' Laboratories listed conduit support intervals required by the California Electric Code.

2 Wire or sheet metal strips are not acceptable for conduit not directly fastened to structure or for multiple conduit runs.

3 Individual conduit 1/2 inch and 3/4 inch size may be supported from ceiling support wire with Caddy clips only if acceptable to local code. Only one conduit is permitted to be attached to any ceiling support wire. Hang such conduit so as not to affect level of ceiling.

4 Avoid attaching conduit to fan plenums. When it is necessary to support conduit from fan plenum, provide a length of flexible conduit between the section attached to the fan plenum and other sections. Provide a length of flexible

conduit between the portion attached to the building to minimize transmission of vibration to the building structure.

N Conduit penetration of roof, walls, floors and ceilings shall be sealed to preserve the integrity of waterproofing, fire rating and soundproofing for which the roof, wall, floor or ceiling is designed. Materials and methods used shall conform to that specified under Architectural sections.

O Underground conduit and ducts 2 inches and larger shall be proven clear by pulling through a mandrel 1/4 inch smaller than the inside diameter.

P Where flush branch circuit panelboards or terminal cabinets are shown on walls, stub a minimum of four (4) 1 inch empty conduit into overhead ceiling spaces and four (4) 1 inch empty conduit into space below floor (if any) in addition to conduit required for circuit wiring.

Q Paint all exposed conduit to match its surroundings.

R Plastic conduits exposed to sun light shall be UV stabilized.

S Where rigid steel conduit runs in direct contact with the earth, conduit shall be wrapped with 10-mill PVC tape to form 40 mil of protection, or shall have factory applied PVC coating.

T Label all conduits at each terminus, pull box, and junction box.

U All conduits shall have a minimum of one pull line.

V All pull lines shall be tagged at both ends so as to indicate the length of the conduit run, source, and the destination.

3.3 INSTALLATION OF WIRE

A Install all wiring in raceway unless specifically shown or noted otherwise.

B Pull no wire into any portion of the conduit system until construction work which may damage the wire has been completed.

C Install wire continuous from outlet to outlet or terminal to terminal. Splices in cables when required shall be made in handholes, pull boxes or junction boxes. Make branch circuit splices in outlet boxes with 8 inches of correctly color-coded tails left in the box.

D Make splices in wires and cables utilizing specified materials and methods.

E Cables and wires passing through handholes shall be full looped inside the handhole (360 degree) and supported on galvanized steel racks, beginning 10” above the bottom of the handhole. Leave handhole in clean condition with debris removed.

F Make ground, neutral, and line connections to receptacle and wiring device terminals as recommended by manufacturer. Provide ground jumper from outlet box to ground terminal of devices when the device is not approved for grounding through the mounting screws.

G Provide Brady wire markers where number of conductors in a box exceed four (4).

H Wiring shall be tested for continuity (600V and below). All systems shall be entirely free from grounds, short circuits, and any or all defects.

I Measure and record the insulation resistance of 600 volt insulated conductors size #4/0 AWG and larger using a 500 volt megger for one minute. Make tests with circuits isolated from source and load.

J All conductor bends must have a radius greater than or equal to the manufacturer’s listed bending radius.

K Label all conductors at each terminus, pull box, and junction box.

3.4 WIRE COLOR CODE

A Color code conductors. Wire sized #8 AWG and smaller shall have integral color coded insulation. Wire sizes #6 AWG and larger may have black insulation but shall be identified by color coded electrical tape at junction, splice, pull and termination points. Apply color tape with 1/2 lap to at least 6 inches of the conductor.

B Color code wire as follows:

Conductors	208/120V	480/277V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	White or Gray (consistent throughout facility)
Ground	Green	Green

3.5 CONNECTIONS TO EQUIPMENT

A General:

1 Furnish and install required power supply conduit and wiring to equipment. See below for other wiring required.

2 Furnish and install a disconnect switch immediately ahead of and adjacent to each magnetic motor starter or appliance unless the motor or appliance is located adjacent to and within sight of the serving panelboard, circuit breaker or switch. Verify equipment nameplate current ratings prior to installation.

3 Mount motor starters including those furnished under other sections or specifications and provide power wiring to them.

4 Install rough-in work for equipment from approved shop drawings to suit the specific requirements of the equipment.

5 Furnish and install magnetic motor starters that are shown on the Drawings or specified under other divisions to be furnished under this division of work. Verify equipment nameplate ratings prior to installation and furnish adequately rated starters for the loads.

6 Furnish and install manual thermal protection for motors not integrally equipped with thermal protection.

7 Furnish and install 120V power to each control panel and time switch requiring a source of power to operate.

B Heating, ventilating, and air conditioning equipment:

1 Coordinate with mechanical contractor for sizes, locations and details of motors, heating units, and control requirements.

2 Provide required power supply conduit and wiring to equipment.

3 Provide a suitable means of disconnect switch immediately ahead of and adjacent to each motor and appliance unless the motor or appliance is located adjacent and within sight of the service panelboard, circuit breaker or switch at a distance allowed by codes. Verify equipment nameplate current ratings prior to installation. Provide a disconnect means at each magnetic motor starter.

4 Provide magnetic motor starters required under this division of work.

5 Provide manual thermal protection for motors not integrally equipped with thermal protection.

6 Line and low voltage temperature control and interlock wiring, conduit, and required connections are a part of other divisions unless specifically shown or noted on the Drawings as to be furnished under this section.

7 Provide 120V power supply to control panels, time switch furnished and installed under other divisions of work.

8 Furnish and install 120V power to each duct detector scheduled for operation of fire dampers or shut down of mechanical equipment. Coordinate the exact quantity and locations with the mechanical drawings.

C Plumbing and other contractor-furnished and Owner-furnished equipment:

1 Required power and control conduit, wiring and connections are included under this section of the work. Control sensing and alarm devices will be furnished under the respective section of the contract supplying the equipment unless noted otherwise. These devices will be located in pipes, ducts, vessels, tanks, etc., and will be mounted in a place by the Contractor furnishing the devices. Other devices shall be mounted under this section of the work.

2 Control panels for packaged equipment will be furnished under the respective section of the contract supplying the equipment unless otherwise noted. Installation and connection of the control panels are under this section of the work.

3.6 SYSTEM NEUTRAL GROUND

A Ground the neutral conductor of each transformer to limit the maximum potential above ground due to normal operating voltage and limit the voltage level due to abnormal conditions.

B Ground transformers with secondary voltage 600V class or less as follows: 3 phase, 4 wire wye connected: ground neutral point.

C For transformers 75kVA size or lower with primary voltage 480V or lower, the primary equipment ground conductor may be used for grounding the secondary neutral provided it is adequately sized in accordance with CEC system ground conductor size.

3.7 EQUIPMENT GROUND

A Ground non-current carrying metal parts of electrical equipment enclosures, frames, or conductor raceways to provide a low impedance path for line to ground fault current and to bond all non current carrying metal parts together. Install a ground conductor in each raceway system. Equipment ground conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per CEC 250.95 unless otherwise shown on drawings.

B Grounding conductors shall be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or enclosure device.

C Install metal raceway couplings, fittings and terminations secure and tight to insure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure and at concentric knockouts.

D Lighting fixtures shall be securely connected to equipment ground conductors. Outdoor lighting standards shall have a factory installed ground for terminating the ground wire.

E Motors shall be connected to equipment ground conductors with a conduit grounding bushing and with a bolted solderless lug connection on the metal frame.

3.8 STRUCTURAL GROUND

A Concrete encased electrode shall be 2 inches above the bottom of concrete footing where shown on drawings. See drawings for details.

B Domestic, chilled and hot water mains and fire protection metallic water pipes shall be connected to the ground bus with #4/0 AWG bare copper conductor at a minimum of two points.

C Miscellaneous metal objects including piping, vessels and structural shapes within six feet of metallic objects connected to the ground system and which are not interconnected mechanically with the grounding system, shall be interconnected with a minimum #6 AWG bare copper conductor.

3.9 IDENTIFICATION

A Provide and install nameplates on all switchboards, distribution boards, panels, motor starters, VFDs, transformers, safety switches/disconnects, push buttons, selector switches, pilot lights, and other similar devices. Fasten nameplates to equipment with one sheet metal screw at each corner.

B Provide and install labels on lighting switches and convenience and special purpose receptacles to show panel and circuit number to which the device is connected.

C Provide and install identification tags on all conduit pull.

D Provide label meeting ANSI Z535 standards on motors reading:
WARNING
AUTOMATIC EQUIPMENT
MAY START AT ANY TIME

3.10 CIRCUIT BREAKER ELECTRICAL COORDINATION STUDY

A If required, contractor shall provide a coordination study to determine trip settings of circuit breakers.

B Contractor may elect to have the engineer of record provide such services at the contractor’s expense.

3.11 ARC FLASH STUDY

A If required, contractor shall provide a study to determine potential arc flash energy.

B Contractor may elect to have the engineer of record provide such services at the contractor’s expense.

END OF SECTION

SECTION 26 05 26 GROUNDING

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with equipment applicable to this project, applicable codes and authorities having jurisdiction, for grounding

1.2 RELATED SECTIONS

A All included sections under Division 1
B All included sections under Division 26
C Plans
D Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS

Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 16000.

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.

1.5 SUBMITTALS

A Submit under provisions of Section 01330. Provide detailed description of items supplied, including specifications, performance characteristics, materials, wiring diagrams and schedules.
    1 Submit evidence that products satisfy seismic requirements for the State of California.
    2 Submit evidence of compliance with the applicable standards listed under Article 1.3 of this section.
B Manufacturer's Instructions: Submit manufacturer's installation instructions.
C Product Data: Submit manufacturer's descriptive literature.
D Shop Drawings: Submit complete fabrication details, elevations and sections of switchboard, dimensions, space available for conduit, rating, short circuit withstand ability of bus and lowest rated device, circuit schedule showing circuit number, device description, device frame ampere rating and trip, fuse clip ampere rating, termination lug size, feeder and circuit identification, conductor ratings and one-line and wiring diagrams. Include both elementary diagram and terminal to terminal wiring diagrams.
E Substitutions: Items of same function and performance shall be in conformance with Division 1.
F Submit field test and operations check report for circuit breakers and motor starters under provisions of Section 16080.

1.6 OPERATION AND MAINTENANCE DATA

A Submit operation instructions, maintenance and repair data under provisions of Division 1.

B Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

C Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

D Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

PART 2 – PRODUCTS

2.1 GROUND RODS

Ground rods shall be:

A. 3/4 inch diameter
B. Copper weld type
C. 10 feet in length.
D. Ground rings

2.2 BARE COPPER GROUND WIRE

Conductors shall be medium-hard drawn, copper, and stranded, with sizes as shown on drawings.

2.3 BELOW GRADE GROUND CONNECTIONS

Utilize CADWELD Multi-System Exothermic Welding.

2.4 HARDWARE

Bolts, nuts and washers shall be bronze, cadmium plated steel, or other non-corrosive material, approved for the purpose.

PART 3 – EXECUTION

3.1 SYSTEM NEUTRAL GROUND

A Ground the neutral conductor of each transformer to limit the maximum potential above ground due to normal operating voltage and limit the voltage level due to abnormal conditions.

B Ground transformers with secondary voltage 600V class or less as follows: 3-phase, 4-wire wye connected: ground neutral point.

C For transformers 75kVA size or lower with primary voltage 480V or lower, the primary equipment ground conductor may be used for grounding the secondary neutral provided it is adequately sized in accordance with CEC system ground conductor size.

3.2 EQUIPMENT GROUND

A Ground non-current carrying metal parts of electrical equipment enclosures, frames, or conductor raceways, structural metal supports for the mechanical and plumbing equipment

to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Install a ground conductor in each raceway system. Equipment ground conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per CEC 250-95 unless otherwise shown on drawings.

B Grounding conductors shall be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or enclosure device.

C Install metal raceway couplings, fittings and terminations secure and tight to insure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure and at concentric knockouts.

D Lighting fixtures shall be securely connected to equipment ground conductors. Outdoor lighting standards shall have a factory installed ground for terminating the ground wire.

E Motors shall be connected to equipment ground conductors with a conduit grounding bushing and with a bolted solderless lug connection on the metal frame.

3.3 STRUCTURAL GROUND

A Concrete encased electrode shall be 2 inches above the bottom of concrete footing where shown on drawings. See drawings for details.

B Domestic, chilled and hot water mains and fire protection metallic water pipes shall be connected to the ground bus with #3/0 AWG bare copper conductor at a minimum of two points.

C Miscellaneous metal objects including piping, vessels and structural shapes within six feet of metallic objects connected to the ground system and which are not interconnected mechanically with the grounding system, shall be interconnected with a minimum #3/0 AWG bare copper conductor.

3.4 GROUND RESISTANCE TEST

A Building ground electrode resistance testing shall be accomplished with a ground resistance, direct reading, single test meter utilizing the Fall-of-Potential method and two (2) referenced electrodes. Perform test prior to interconnection to other grounding system. Orient the concrete encased ground electrode to be tested and the two referenced electrodes in straight line spaces fifty (50) feet apart. Drive the two (2) reference electrodes ten (10) feet deep.

B Test results shall be in writing, and shall show temperature, humidity and condition of the soil at the time of the tests. In the case where the ground resistance exceeds 25 ohms, add an additional ground rod and retest. Add additional ground rods when necessary in order to bring the ground resistance below 25 Ohms. All testing shall be done prior to concrete pour and in the presence of the inspector of record. Provide test results for engineer review.

END OF SECTION

SECTION 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Hangers and supports for electrical equipment and systems.
B. Construction requirements for concrete bases.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B American Society for Testing and Materials (ASTM)
  1 ASTM A36/A36M: Standard Specification for Carbon Structural Steel
  2 ASTM A167: Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
  3 ASTM A276: Standard Specification for Stainless Steel Bars and Shapes
  4 ASTM A325: Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength
  5 ASTM A563: Standard Specification for Carbon and Alloy Steel Nuts
  6 ASTM B221: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
  7 ASTM B632: Standard Specification for Aluminum-Alloy Rolled Tread Plate
  8 ASTM B633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
  9 ASTM E488: Standard Test Methods for Strength of Anchors in Concrete Elements
  10 ASTM F594: Standard Specification for Stainless Steel Nuts
C American Welding Society (AWS)
  1 AWS D1.1: Structural Welding Code - Steel
D California Building Safety Codes (CBSC)
  1 California Building Code (CBC)
  2 California Electrical Code (CEC)
E General Services Administration
  1 FF-S-325

2 W-C-582: Conduit, Raceway, Metal and Fittings: Surface
3 WW-H-171: Hanger and Support, Pipe

F ICC Evaluation Service (ICC-ES)
1 ESR-1917

G Manufacturers Standardization Society (MSS)
1 MSS SP-58: Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation
2 MSS SP-69: Pipe Hangers and Supports – Selection and Application

H Metal Framing Manufacturers' Association
1 MFMA-4: Metal Framing Standard Publication
2 MFMA-101: Guidelines for the Use of Metal Framing

I National Electrical Contractors Association
1 NECA 1: Standard Practice of Good Workmanship in Electrical Construction
2 NECA 101: Standard for Installing Steel Conduits (Rigid, IMC, EMT)

J Underwriters' Laboratories
1 UL 2239: Hardware for the Support of Conduit, Tubing, and Cable

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
B. Comply with latest editions of the California Building Code and California Electric Code

1.5 SUBMITTALS

A. Submit under provisions of Section 013000 or 013300.
B. Submittals shall include the following:
1. Table of contents
2. A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3. Part numbers
4. Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5. Maintenance instructions and intervals
6. A complete set of drawings for any special items
C. Electronic submittals shall be searchable
D. Shop drawings shall be stamped and signed by a licensed structural engineer. Show fabrication and installation details and include calculations for the following:
1. Trapeze hangers: include product data for components
2. Steel slotted channel systems: include product data for components
3. Equipment supports
E. Welding certificates
F. The submittal shall be substantially complete for all items and equipment furnished under this section.
G. Individual drawings and data sheets submitted at random intervals will not be accepted for review.
H. Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit manuals at close out.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Load ratings
4 Material type(s)
5 Environmental ratings
6 Maintenance requirements
7 Installation instructions
8 Repair instructions (where applicable)
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

1.7 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

PART 2 – PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems
1. Comply with MFMA-4, factory-fabricated components for field assembly.
2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings:
a. PVC, polyurethane, or polyester coating applied according to MFMA-4.
b. Minimum thickness shall be 40 mils.
4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
5. Channel Dimensions: Selected for applicable load criteria.
6. Manufacturers:
a. Cooper B-Line, Inc.
b. ERICO International Corporation
c. Hilti Corporation
d. Thomas & Betts Corporation
e. Unistrut
f. Approved equal
B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components:

1. General:
   a. Anchors shall be steel with corrosion resistant, durable coating or stainless steel
   b. Select anchors with strength required for anchor and as tested according to ASTM E488.
   c. Minimum length shall be eight times diameter.
   d. Tension, shear, and pullout capacities shall be appropriate for supported loads and building materials used
   e. Post installed anchors must be listed in a current evaluation report issued by one of the following:
      1. International Code Council Evaluation Service (ICC-ES) (http://www.icc-es.org/reports/index.cfm?search=search)
      2. City of Los Angeles Research Report
2. Powder-Actuated Fasteners:
   a. Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood
   b. Manufacturers:
      1. Hilti Corporation
      2. Simpson Strong-Tie Co., Inc.
      3. Approved equal
3. Mechanical-Expansion Anchors:
   a. Insert-wedge-type, stainless steel, for use in hardened portland cement
   b. Anchors shall meet the descriptive part of Federal Specifications FF-S-325 Group II, Type 2, Class 2, Style 1.
   c. Anchors shall be equivalent to Hilti Kwik-Bolt TZ.
4. Concrete inserts shall be steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58
5. Clamps for attachment to steel structural elements: MSS SP-58, type suitable for attached structural element
6. Through bolts shall be structural type, hex head, high strength and comply with ASTM A325
7. Toggle Bolts: All-steel springhead type
8. Hanger Rods: Threaded steel

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials:

1. Comply with requirements with ASTM A36 (ferrous metals), ASTM A167 and ASTM A276 (stainless steel), and ASTM B221 and B632 (aluminum) for shapes and plates.
2. Hot dipped galvanized steel
3. Stainless steel for corrosive areas

2.3 CONCRETE BASES

A. Concrete Pad
   1. Concrete shall have strength of 3000 PSI within 28 days.
   2. The pad shall be large enough to achieve the following:
      a. Edge of anchor bolt holes shall be a minimum of 10 times the bolt diameter from edge of pad.
      b. Edge of equipment shall be a minimum of 8 inches from edge.
   3. Minimum thickness shall be 12 inches with 3 inch deep by 12 inch wide footing around perimeter
   4. Bottom of footings shall be a minimum of 8” below finished grade.
   5. Pad shall include #4 rebar at 10 inch intervals in both x direction and y direction.
B. Concrete Pole Bases: Refer to Typical Details

PART 3 – EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by California Electrical Code. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
C. Multiple Raceways or Cables:
   1. Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
   2. Secure raceways and cables to these supports with two-bolt conduit clamps
D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in California Electric Code.
C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (890 N).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code.
   1. Wood framing: Fasten with lag screws or through bolts.
   2. Light gauge steel framing: self tapping screws
   3. Steel beams: beam clamps
   4. Concrete: expansion fasteners

3.3 CONDUIT SUPPORTS

A Conduit supports
   1 For Individual conduit runs not directly fastened to the structure: Rod hangers
   2 For multiple conduit runs: Trapeze type conduit support designed for maximum loading deflection not exceeding manufacturer's recommendations.
   3 Wire or sheet metal strips are not acceptable for conduit not directly fastened to structure or for multiple conduit runs.

B Support conduit with Underwriters' Laboratories listed conduit support intervals required by the California Electric Code.

C Individual conduit 1/2 inch and 3/4 inch size may be supported from ceiling support wire with Caddy clips only if acceptable to local code. Only one conduit is permitted to be attached to any ceiling support wire. Hang such conduit so as not to affect level of ceiling.

D Avoid attaching conduit to fan plenums. When it is necessary to support conduit from fan plenum, provide a length of flexible conduit between the section attached to the fan plenum and other sections. Provide a length of flexible conduit between the portion attached to the building and the rest of the conduit run to minimize transmission of vibration to the building structure.

E Supports anchored to earth shall be anchored in a concrete base per details.

3.4 INSTALLATION OF POST-INSTALLED ANCHORS

A. Minimum distances
   1. Bolt hole edge to edge of concrete: 10 times bolt diameter
   2. Bolt center to bolt center: 12 times bolt diameter

B. Expansion type anchors
   1. Anchor shall be installed and torque per manufacturer’s recommendations.
   2. Setting verification:
      a. Torque-controlled anchors: Following attainment of 10% of the required torque, torque-controlled anchors shall not require more than six (6) additional complete turns of the nut during installation to achieve the manufacturer's specified installation torque. The extent of bolt projection after installation shall be measured to confirm that this requirement has been met.
      b. Displacement-controlled anchors: The position of the plug in the anchor shell shall be checked with the manufacturer-supplied installation tool or other appropriate device. The position of the plug shall conform to the manufacturer's specifications.
   3. Allowable loads
      a. Anchors not installed in underside of beam/slab:
         1. When tested in accordance with AC01, Section 5.6: Values listed in ICC-ES report

2. When not tested in accordance with AC01, Section 5.6: 80% of values listed in ICC-ES report

b. Anchors installed in underside of beam/slab:

1. When tested in accordance with AC01, Section 5.6: Values for anchor without special inspection or in cracked concrete in ICC-ES report

2. When not tested in accordance with AC01, Section 5.6: 80% of values for anchor without special inspection or in cracked concrete in ICC-ES report

C. Epoxy-type (adhesive) Anchors

1. Allowable loads: values from ICC-ES report when compliant with AC58.

D. Anchors must receive special inspection per CBC Section 1704.15.

3.5 TESTING AND INSPECTION OF POST-INSTALLED ANCHORS

A. General

1. Post-installed anchors shall be tested in accordance with the provisions of 2001 California Building Code Section 1923A.3.5, by an authority having jurisdiction accepted testing facility, unless approval of an alternative individual is obtained in advance from the authority having jurisdiction.
2. If any anchor fails testing, test all anchors of the same type, not previously tested until twenty (20) consecutive anchors pass, then resume the initial test frequency. If the anchors are used for the support and bracing of non-structural components (pipe, duct or conduit), the twenty (20) shall be only those anchors installed by the same trade.
3. Test equipment (including torque wrenches) is to be calibrated by an approved testing laboratory in accordance with standard recognized procedures.
4. Regardless of which test method is chosen, test values and all appropriate criteria shall be shown on the contract documents.
5. Anchor diameter refers to the thread size for the wedge and sleeve categories, and to the anchor outside diameter for the sleeve category.
6. Apply proof test loads to wedge and sleeve anchors without removing the nut if possible. If not, remove nut and install a threaded coupler to the same tightness as the original nut using a torque wrench to apply the test load.
7. For sleeve/shell internally threaded categories, verify that the anchor is not prevented from withdrawing by a baseplate or other fixtures. If restraint is found, loosen and shim or remove fixture(s) prior to testing.
8. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
9. Alternate torque test procedures and test values for shell type anchors may be submitted to the enforcement agency for review and approval on a case-by-case basis when test procedures are submitted and approved by the enforcement agency.
10. Required test loads may be determined by either of the following methods:
    a. Twice the allowable tension load from Part 3.4.
    b. Tension or torque test values from the table and procedures.

Test Values (Hardrock or Lightweight Concrete)							
Anchor	Wedge		Sleeve		Shell		Screw
Diameter (in)	Load (lbs)	Torque (ft. lbs)	Load (lbs)	Torque (ft. lbs)	Load (lbs)	Torque (ft. lbs)	Torque (ft. lbs)
1/4	800	10	400	4	1000	-	-
5/16	-	-	400	5	1400	-	-
3/8	1100	25	700	10	1800	-	10
1/2	2000	50	900	20	2700	-	10
5/8	2300	80	1100	45	3700	-	10
3/4	3700	150	1400	90	5400	-	20
1	5800	250	-	-	-	-	-

11. If the manufacturer's recommended installation torque is less than the test torque noted in the table, the manufacturer's recommended installation torque should be used in lieu of the tabulated values.

B. Expansion-type Anchors

1. The test load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, calibrated spring-loaded devices, or a calibrated torque wrench. Displacement-controlled anchors such as drop-ins shall not be tested using a torque wrench.
2. Anchors tested with a hydraulic jack should exhibit no discernable movement during the tension test, e.g., as evidenced by loosening of the washer under the nut.
3. Anchors tested with a calibrated torque wrench must attain the specified torque within 1/2 turn of the nut.
4. Exceptions: Undercut anchors that are so designed to allow visual confirmation of full set, need not be tension or torque tested. If the manufacturer's installation torque is less than the specified test torque, use the manufacturer's specified installation torque for testing the anchor.
5. Apply proof test loads to wedge and sleeve anchors without removing the nut if possible. If not, remove nut and install a threaded coupler to the same tightness as the original nut using a torque wrench to apply the test load.
6. For sleeve/shell internally threaded categories, verify that the anchor is not prevented from withdrawing by a baseplate or other fixtures. If restraint is found, loosen and shim or remove fixture(s) prior to testing.
7. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
8. Shell type anchors should be tested as follows:
   a. Visually inspect 25% for full expansion as evidenced by the location of the expansion plug in the anchor body. Plug location of a fully expanded anchor should be as recommended by the manufacturer, or, in the absence of such recommendation, as determined on the job site following the manufacturer's installation instructions. At least 5% of the anchors shall be proof loaded as indicated in the table above, but not less than three anchors per day for each different person or crew installing anchors, or;
   b. Test installed anchors per current edition of the CBC Section 1913A.7.

C. Epoxy-type (adhesive) Anchors

1. Epoxy-type (adhesive) anchors shall be tension tested per current edition of the CBC Section 1913A.7. The tension test load shall equal twice the allowable load for the specific location of the anchor to be tested (i.e., accounting for edge distance) or 80% of the yield strength of the bolt ($0.8A_bF_y$), whichever is less. The

test procedures for expansion-type anchors in the attached table shall also be used for epoxy-type (adhesive) anchors. Torque testing of epoxy-type (adhesive) anchors is not permitted.

2. Where epoxy-type (adhesive) anchors are used as shear dowels across cold joints in slabs on grade and the slab is not part of the structural system, testing of those dowels is not required.
3. Anchors shall exhibit no discernible movement during the tension test.

D. Screw-type Anchors

E. The following criteria apply for the acceptance of installed anchors:
1. Hydraulic ram method: The anchor should have no observable movement at the applicable test load. For wedge and sleeve type anchors, a practical way to determine observable movement is that the washer under the nut becomes loose.
2. Torque wrench method: The applicable test torque must be reached within the following limits:
a. Wedge or Sleeve type: One-half (1/2) turn of the nut.
b. One-quarter (1/4) turn of the nut for the 3/8 in. sleeve anchor only.

3.6 PAINTING

A. Touchup:
1. Clean field welds and abraded areas of shop paint.
2. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting.
3. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
4. Comply with the following requirements
a. Architectural painting specifications
b. SSPC-PA 1 requirements for touching up field-painted surfaces.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION

SECTION 26 05 48 VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

Anchoring and vibration isolation equipment for electrical equipment:

A. Isolation pads
B. Spring isolators
C. Restrained spring isolators
D. Channel support systems
E. Restraint cables
F. Hanger rod stiffeners
G. Anchorage bushings and washers

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
- 1 Section 013000: Administrative Requirements
- 2 Section 013300: Submittal Procedures
- 3 Section 014000: Quality Requirements
- 4 Section 016000: Product Requirements
- 5 Section 017000: Execution and Closeout Requirements
- 6 All other included sections under Division 1

B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B American Society for Testing and Materials (ASTM)
- 1 ASTM A36/A36M: Standard Specification for Carbon Structural Steel
- 2 ASTM A325: Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength
- 3 ASTM A563: Standard Specification for Carbon and Alloy Steel Nuts
- 4 ASTM B633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- 5 ASTM E488: Standard Test Methods for Strength of Anchors in Concrete Elements
- 6 ASTM F594: Standard Specification for Stainless Steel Nuts

C American Welding Society (AWS)
- 1 AWS D1.1: Structural Welding Code - Steel

D California Building Safety Codes (CBSC)
- 1 California Building Code (CBC)
- 2 California Electrical Code (CEC)

E General Services Administration

1 FF-S-325
2 W-C-582: Conduit, Raceway, Metal and Fittings: Surface
3 WW-H-171: Hanger and Support, Pipe

F ICC Evaluation Service (ICC-ES)
1 ESR-1917

G National Electrical Contractors Association
1 NECA 1: Standard Practice of Good Workmanship in Electrical Construction

H Underwriters' Laboratories

1.4 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency meeting requirements of Part 1.6, 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.

D. Comply with latest editions of the California Building Code and California Electric Code

1.5 SUBMITTALS

A. Submit under provisions of Section 013000 or 013300.

B. Submittals shall include the following:
1. Table of contents
2. A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3. Part numbers
4. Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5. Maintenance instructions and intervals
6. A complete set of drawings for any special items
7. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
8. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency meeting requirements of Part 1.6.
b. Annotate to indicate application of each product submitted and compliance with requirements.
9. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.

C. Electronic submittals shall be searchable

D. Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including

analysis data signed and sealed by the qualified licensed structural engineer responsible for their preparation.

1. Design Calculations:
    a. Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.
    b. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other electrical Sections for equipment mounted outdoors.
2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
3. Field-fabricated supports.
4. Seismic-Restraint Details:
    a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacing. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    c. Preapproval and Evaluation Documentation: By an agency meeting requirements of Part 1.6, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

E. Welding certificates.

F. Field quality-control test reports.

G. The submittal shall be substantially complete for all items and equipment furnished under this section.

H. Individual drawings and data sheets submitted at random intervals will not be accepted for review.

I. Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit manuals at close out.

B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Load ratings
4 Material type(s)
5 Environmental ratings
6 Maintenance requirements
7 Installation instructions
8 Repair instructions (where applicable)

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

1.7 PERFORMANCE REQUIREMENTS

Seismic-Restraint Loading:

A. Site Class as Defined in the CBC: Refer to structural plans
B. Assigned Seismic Use Group or Building Category as Defined in the CBC: Refer to structural plans
    1. Component Importance Factor: Refer to structural plans
    2. Component Response Modification Factor: Refer to structural plans
    3. Component Amplification Factor: Refer to structural plans
C. Mapped Spectral Acceleration for Short Period (0.2 Second): S_S Refer to structural plans
D. Site Coefficient for Short Period: F_a Refer to structural plans
E. Maximum Spectral Response Acceleration for Short Period: S_{MS} Refer to structural plans
F. Design Spectral Response Acceleration for Short Period: S_{DS} Refer to structural plans
G. Mapped Spectral Acceleration for 1 Second Period: S_1 Refer to structural plans
H. Site Coefficient for 1 Second Period: F_v Refer to structural plans
I. Maximum Spectral Response Acceleration for 1 Second Period: S_{M1} Refer to structural plans
J. Design Spectral Response Acceleration for 1 Second Period: S_{D1} Refer to structural plans

1.8 QUALIFICATIONS OF TESTING AGENCY

The testing agency shall meet the following requirements:

A. Federal OSHA criteria for accreditation of testing laboratories, Standard Number 1910.7 (Definition and Requirements for a nationally recognized testing laboratory). Membership in the National Electrical Testing Association constitutes proof of meeting such criteria.
B. Acceptable to authorities having jurisdiction.

PART 2 – PRODUCTS

2.1 VIBRATION ISOLATORS

A. Pads:
    1. Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
    2. Resilient Material: Oil and water resistant, waffle embossed neoprene.
B. Spring Isolators: Freestanding, laterally stable, open-spring isolators.
    1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
    2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
    3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
    4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
    5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- (6-mm-) thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig (3447 kPa).
    6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.
C. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.2 SEISMIC-RESTRAINT DEVICES

A. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an agency meeting requirements of Part 1.6.
B. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four (verify with structural engineer) times the maximum seismic forces to which they will be subjected.
C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
D. Restraint Cables: ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or reinforcing steel angle clamped to hanger rod. Do not weld stiffeners to rods.
F. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings and matched to type and size of anchors and studs.
G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings and matched to type and size of attachment devices.
H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
I. Mounting, Anchoring, and Attachment Components: Refer to Section 260529.
J. Steel parts shall be hot dipped galvanized after fabrication for dry areas or stainless steel for damp or wet locations.

PART 3 – EXECUTION

3.1 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency meeting requirements of Part 1.6.

B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.2 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Equipment and Hanger Restraints:
   1. Install restrained isolators on electrical equipment.
   2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
   3. Install seismic-restraint devices using methods approved by an agency meeting requirements of Part 1.6 providing required submittals for component.

B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

D. Drilled-in Anchors:
   1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
   2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
   3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
   4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
   5. Set anchors to manufacturer's recommended torque, using a torque wrench.
   6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.3 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.4 FIELD QUALITY CONTROL

Tests and Inspections:

A. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.

B. Test at least 10% of each type and size of installed anchors and fasteners selected by Architect.
C. Test to 90 percent of rated proof load of device.
D. Measure isolator restraint clearance.
E. Measure isolator deflection.
F. Verify snubber minimum clearances.
G. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
H. Remove and replace malfunctioning units and retest as specified above.
I. Prepare test and inspection reports.

3.5 ADJUSTING

A. Adjust isolators after isolated equipment is at operating weight.
B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
C. Adjust active height of spring isolators.
D. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.6 ELECTRICAL VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE

A. Provide the owner with a schedule of all major supported or suspended electrical equipment. Include the following.
    1. Equipment Location
    2. Pads:
        a. Material
        b. Thickness
        c. Durometer
        d. Number of Pads
    3. Isolator Type
    4. Component Importance Factor
    5. Component Response Modification Factor
    6. Component Amplification Factor
B. Provide the owner with cut sheets for all other support equipment.

END OF SECTION

SECTION 26 08 00 COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A Testing in conformity with equipment applicable to this project, applicable codes and authorities having jurisdiction

B Test equipment requirements listed in this section shall apply to testing required by all other sections in Division 26, Division 27, and Division 28.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
1 Section 013000: Administrative Requirements
2 Section 013300: Submittal Procedures
3 Section 014000: Quality Requirements
4 Section 016000: Product Requirements
5 Section 017000: Execution and Closeout Requirements
6 All other included sections under Division 1

B All included sections under Division 26

C All included sections under Division 27

D All included sections under Division 28

E Plans

F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

B California Electrical Code

C International Electrical Testing Association (NETA)
1 NETA ATS: for Acceptance Testing Specifications for Electrical Power Equipment and Systems

D Institute of Electrical and Electronic Engineers
1 IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements
2 IEEE 82: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors
3 IEEE 95: Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors
4 IEEE 112: Standard Test Procedure for Polyphase Induction Motors and Generators
5 IEEE 114: Standard Test Procedure for Single-Phase Induction Motors
6 IEEE 115: IEEE Guide for Test Procedures for Synchronous Machines Part I—Acceptance and Performance Testing Part II—Test Procedures and Parameter Determination for Dynamic Analysis
7 IEEE 141: Recommended Practice for Electric Power Distribution for Industrial Plants
8 IEEE 142: Recommended Practice for Grounding of Industrial and Commercial Power Systems

9 IEEE 241: Recommended Practice for Electric Power Systems in Commercial Buildings
10 IEEE 242: Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book)
11 IEEE 252: Standard Test Procedure for Polyphase Induction Motors Having Liquid in the Magnetic Gap
12 IEEE 259: Standard Test Procedure for Evaluation of Systems of Insulation for Dry-Type Specialty and General-Purpose Transformers
13 IEEE 389: Recommended Practice for Testing Electronics Transformers and Inductors
14 IEEE 393: Test Procedures for Magnetic Cores
15 IEEE 399: Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book)
16 IEEE 400: Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems Rated 5 kV and Above
17 IEEE 442: Guide for Soil Thermal Resistivity Measurements
18 IEEE 495: Guide for Testing Faulted Circuit Indicators
19 IEEE 576: Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications
20 IEEE 1188: Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications
21 IEEE 1234: Guide for Fault Locating Techniques on Shielded Power Cable Systems
22 IEEE 1415: Guide for Induction Machinery Maintenance Testing and Failure Analysis
23 IEEE 1458: Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded Case Circuit Breakers for Industrial Applications

E National Institute of Standards and Technology (NIST)

F Underwriters' Laboratories
1 UL 1244: Electrical and Electronic Measuring and Testing Equipment
2 UL 1436: Outlet Circuit Testers and Similar Indicating Devices
3 UL 61010-2-030: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for testing and measuring circuits
4 UL 61010B-1: Electrical Measuring and Test Equipment – Part 1: General Requirements
5 UL 61010B-2-031: Electrical Equipment for Measurement, Control, and Laboratory Use – Part 2: Particular Requirements for Hand-Held Probe Assemblies for Electrical Measurement and Test
6 UL 61010B-2-032: Electrical Equipment for Measurement, Control, and Laboratory Use – Part 2: Particular Requirements for Hand-Held Current Clamps for Electrical Measurement and Test

1.4 QUALITY ASSURANCE

A The Contractor shall engage and pay for the services of a recognized independent testing laboratory for the purpose of performing inspections and tests as herein specified.

B The testing laboratory shall provide all material, equipment, labor and technical supervision to perform switch tests and inspections.

C It is the intent of these tests to assure that all electrical equipment, both Contractor and Owner supplied, is operational within industry and manufacturer's tolerances and is installed in accordance with design specifications.
D The tests and inspections shall determine the suitability for energizing.
E Schedule tests and give a minimum of two weeks advance notice to the Owner.

1.5 SUBMITTALS

A List of tests preformed
B Test procedures
C Test results
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.

1.6 QUALIFICATIONS OF TESTING AGENCY

The testing agency shall meet federal OSHA criteria for accreditation of testing laboratories, Standard Number 1910.7 (Definition and Requirements for a nationally recognized testing laboratory). International Electrical Testing Association (NETA) accreditation constitutes proof of meeting such criteria.

1.7 TEST INSTRUMENT TRACEABILITY

A The testing laboratory shall have a calibration program which maintains all applicable test instrumentation within rated accuracy.
B The accuracy shall be traceable to the National Institute of Standards and Technology (NIST) in an unbroken chain.
C Instruments shall be calibrated in accordance with the following frequency schedule:
1 Field instruments: 6 months maximum.
2 Laboratory instruments: 12 months.
3 Leased specialty equipment: 12 months
D Dated calibration labels shall be visible on all test equipment.

1.8 FINAL SETTINGS

A The test report shall include the following: summary of project, description of equipment tested, description of test, list of test equipment used in calibration and calibration date, test results, conclusions and recommendations, and appendix, including appropriate test forms.
B The test report shall be bound and its contents certified.
C Submit three copies of the completed report to the architect, or engineer if no architect is involved, no later than fifteen (15) days after completion of test, unless otherwise directed.

1.9 FAILURE TO TEST

A Any system material or workmanship which is found defective on the basis of acceptance tests shall be reported directly to the architect or engineer if no architect is involved.
B Contractor shall replace the defective material or equipment and have test repeated until test proves satisfactory without additional cost to the Owner.

PART 2 – PRODUCTS: [NOT USED]

PART 3 – EXECUTION

3.1 GROUND RESISTANCE TEST

A Building ground electrode resistance testing shall be accomplished with a ground resistance, direct-reading, single test meter utilizing the Fall-of-Potential method and two (2) referenced electrodes. Perform test prior to interconnection to other grounding system. Orient the concrete-encased ground electrode to be tested and the two referenced electrodes in straight line spaces fifty (50) feet apart. Drive the two (2) reference electrodes ten (10) feet deep.

B Test results shall be in writing, and shall show temperature, humidity and condition of the soil at the time of the tests. In the case where the ground resistance exceeds 25 ohms, add an additional ground rod and retest. Add additional ground rods when necessary in order to bring the ground resistance below 25 Ohms. All testing shall be done prior to concrete pour and in the presence of the inspector of record. Provide test results for engineer review.

3.2 MISCELLANEOUS TESTING

A Functional and operational testing to the fire alarm, security system, telephone system, paging/intercom system, and all electrical components upon completion of electrical work.

B Perform an insulation resistance test on all switchboard busses, bus ducts; feeder conductors, including neutrals, using a megohmeter. Minimum value for each conductor shall be 20 megohms.

3.3 ELECTRICAL DISTRIBUTION EQUIPMENT OPERATIONAL CHECK

A Electrical distribution equipment operational check includes main switchboards, distribution boards, panelboards, panels, switchgear, etc.

B Verify proper operating condition of all equipment mechanically and electrically including, but not limited to verifying operation of each circuit breaker trip device with a rating of 100A or more using an accurately metered timed instrument (by passing 300% rated current through each pole).

C If any equipment is found defective during operational check, it shall be replaced by the Contractor without cost to the Owner. The tests shall be repeated by the Contractor without cost to the owner until satisfactory results are obtained.

END OF SECTION

SECTION 26 22 00 LOW VOLTAGE (0-600V) TRANSFORMERS

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes minimum requirement for low voltage transformers.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A All included specifications included within the plans.
B Plans
C Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Transformers 750kVA and smaller shall be listed by Underwriters Laboratories.
B Institute of Electrical and Electronics Engineers (IEEE)
1 IEEE 259: Standard Test Procedure for Evaluation of Systems of Insulation for Dry-Type Specialty and General-Purpose Transformers
2 IEEE 295: Electronics Power Transformers
3 IEEE 389: Recommended Practice for Testing Electronics Transformers and Inductors
4 IEEE 393: Test Procedures for Magnetic Cores
5 IEEE C57.12.01: Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings
6 IEEE C57.12.28: Pad Mounted Equipment Enclosure Integrity
7 IEEE C57.12.28: Pad Mounted Equipment Enclosure Integrity for Coastal Applications (where applicable)
8 IEEE C57.12.34: Three Phase, Pad Mounted, Distribution Transformers
9 IEEE C57.12.38: Single Phase, Pad Mounted, Distribution Transformers
10 IEEE C57.12.60: Standard Test Procedure for Thermal Evaluation of Insulation Systems for Dry-Type Power and Distribution Transformers, Including Open-Wound, Solid-Cast, and Resin-Encapsulated Transformers
11 IEEE C57.12.91: Standard Test Code for Dry-type Distribution and Power Transformers
12 IEEE C57.98: Guide for Transformer Impulse Tests
C National Electrical Manufacturers' Association
1 Transformers shall be manufactured and tested in accordance with NEMA ST20.
D National Fire Protection Association
1 NFPA 70: National Electrical Code
E ANSI C57.110 and ANSI C57.12.22 requirements for pad mounted, compartmental type, self cooled, three phase distribution transformers and applicable provisions of other ANSI standards C57 Series.
F Underwriters' Laboratories
1 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3 UL 467: Grounding and Bonding Equipment
4 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

5 UL 1332: Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment
6 UL 1446 Systems of Insulating Materials – General
7 UL 1561: Dry-type General Purpose and Power Transformers
8 UL 2763: Energy Efficient Harmonic Cancellation Transformers
9 UL 5085-1: Low Voltage Transformers – Part 1: General Requirements
10 UL 5085-2: Low Voltage Transformers – Part 2: General Purpose Transformers

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
F Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
G Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 A complete set of drawings for any special items
7 Wiring diagrams
8 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
B Electronic submittals shall be searchable.
C Shop drawings required: drawings and descriptions containing information of weight, dimensions, rated kVA, sound level, impedance, voltage regulation and efficiency. Provide manufacturer's literature describing the product.
D Test report of transformer furnished as hereinafter specified.
E The submittal shall be substantially complete for all items and equipment furnished under this section.
F Individual drawings and data sheets submitted at random intervals will not be accepted for review.
G Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer's user and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 Calibrated range
10 List of capabilities
11 Environmental ratings
12 NEMA enclosure type
13 Maintenance requirements
14 Installation instructions
15 Repair instructions
C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 DISTRIBUTION TRANSFORMERS

A General
1 Except as otherwise indicated, provide manufacturer's standard materials and components, as indicated by published product information, designed and constructed as recommended by manufacturer and as required for complete installation.
2 Temperature
a 150°C rise
b Self-cooled type
c The maximum temperature of the top of the enclosure shall not exceed 50°C rise above a 40°C ambient.
3 Impedance shall be manufacturer's standard.
4 All insulating materials used shall be in accordance with NEMA ST20 or NEMA TR27 standards and be rated for 220°C UL component recognized insulation system.
5 The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable NEMA, IEEE and ANSI standards.
6 Primary voltage, secondary voltage, and kVA capacity shall be as shown on the single line or three line diagram(s).
7 All windings shall be copper.
B Manufacturer:

1 Square D
2 General Electric
3 Eaton
4 MGM
5 Approved equal

C Enclosure
1 Dead front
2 Transformers 25 kVA and larger shall be in a heavy gauge, sheet steel, ventilated enclosure
3 Provide wire fabric rodent guard over ventilated openings and designed to prevent accidental access to live parts in accordance with UL, NEMA, and California Electric Code standards for ventilated enclosures.
4 Mounting
a Transformers 15 kVA through 75 kVA shall be designed so they can be either floor or wall mounted.
b Transformers above 75 kVA shall be floor mounted.
5 Corrosion resistant coating
a The completed enclosure shall be degreased and cleaned.
b After the cleaning process is finished, the enclosure shall be phosphatized.
c After the phosphatizing, the enclosure shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard, durable finish.
1 The minimum thickness of the paint film shall be 2.0 mils.
2 For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.
3 Paint film shall be uniform in color and free from blisters, sags, flaking and peeling
d Finish shall conform to UL 50 and UL 50E.
e Color shall be ANSI 61 Gray.
f Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

D Sound: Sound levels shall be guaranteed by the manufacturer not to exceed the following.
1 15-50 kVA 45 dB
2 51-150 kVA 50 dB
3 151-300 kVA 55 dB
4 301-500 kVA 60 dB
5 501-700 kVA 62 dB
6 701-1000 kVA64 dB
7 1000-1500 kVA65 dB
8 1501-2000 kVA66 dB

E Efficiency: Transformers shall be low loss type with minimum efficiencies per DOE 2016.

F The transformer(s) shall supply phase shift of 0° or 30°.

G Transformers shall be supplied with quality, full width electrostatic shields resulting in a maximum effective coupling capacitance between primary and secondary of 33 picofarads. With transformers connected under normal, loaded operating conditions, the attenuation of line noise and transients shall equal or exceed the following limits.

1 Common Mode: 0 to 1.5kHZ - 120dB; 1.5kHZ to 10kHZ - 90dB; 10kHZ to 100kHZ - 65dB; 100kHZ to 1MHZ - 40dB

2 Transverse Mode: 1.5kHZ to 10kHZ - 52dB; 10kHZ to 100kHZ - 30dB; 100kHZ to 1MHZ – 30dB

2.2 BUCK-BOOST TRANSFORMERS

A. Where the available voltage is above the acceptable range (including taps), provide and install a bucking transformer.

B. Where the available voltage is below the acceptable range (including taps), provide and install a boosting transformer.

C. Voltage at secondary of buck or boost transformer shall be as close as possible to the nominal voltage of the system. Coordinate secondary voltage of buck or boost transformer, quantity of buck or boost transformers, and use of taps on distribution transformer to achieve this.

D. Transformer shall be compatible with the voltage.

E. Temperature rise, enclosure, efficiencies, and sound levels shall meet the requirements of the distribution transformers.

2.3 CONTROLS TRANSFORMERS

A. Control transformers shall provide secondary voltage within limits of the equipment that it supplies.

B. Transformer shall be completely enclosed or have OEM covers for all exposed, live parts. Covers shall be securely mounted transformer.

C. When transformers are mounted within a control panel, the transformer shall be mounted at the top, near a vent.

D. Whenever possible, the transformer shall be mounted outside of hazardous areas. When not possible, the transformer shall be listed for use within the classification of the hazardous area.

E. Temperature rise, enclosure, efficiencies, and sound levels shall meet the requirements of the distribution transformers.

2.4 CONSTRUCTION

A Transformer coils shall be of copper windings, continuous wound construction, and shall be impregnated with non-hygroscopic, thermosetting varnish.

B All cores shall be constructed with low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point to prevent core overheating. Cores for transformers greater than 500kVA shall be clamped utilizing insulated bolts through the core laminations to ensure proper pressure throughout the length of the core. The completed core and coil shall be bolted to the base of the enclosure but isolated by means of rubber vibration-absorbing mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure except for a flexible safety ground strap. Sound isolation systems requiring the complete removal of all fastening devices will not be acceptable.

C The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable UL and NEC standards.

D The transformer enclosures shall be ventilated and be fabricated of heavy gauge, sheet steel construction. The entire enclosure shall be finished utilizing a continuous process consisting of degreasing, cleaning, and phosphatizing; followed by electrostatic

deposition of polymer polyester powder coating and baking cycle to provide uniform coating of all edges and surfaces. The coating shall be UL recognized for outdoor use. The coating color shall be ANSI 49.

PART 3 – EXECUTION

3.1 ANCHORING

A Install transformers as indicated, complying with manufacturers written instructions, applicable requirements of CEC, NEMA, ANSI, and IEEE standards, and in accordance with recognized industry practices to ensure that products fulfill requirements.

B Floor and roof mounted transformers shall be mounted on steel plates cemented to neoprene pads with a bolt hole through both. Refer to details. Conduit entering transformers shall be isolated from case with oversize hole, ground wire, and rubber grommet.

C Anchor transformer to concrete pad with 3/4" minimum diameter anchor bolts. Bolts and washers shall be galvanized. Strength of materials used to secure the transformer shall be sufficient to resist shear and uplift produced by force equal to one half of the equipment mass applied horizontally at center of gravity.

3.2 GROUNDING

Provide equipment grounding connections, sufficiently tight, to assure permanent and effective ground, for transformers as indicated.

3.3 TESTING

Upon completion of installation of transformers, energize primary circuit at rated voltage and frequency from normal power source and test transformers, including, but not limited to, audible sound levels, to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at the site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with re-testing.

END OF SECTION

SECTION 26 24 16 PANELBOARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES

Lighting and Appliance Panelboards

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B California Electrical Code
C California Building Code
D Institute of Electrical and Electronic Engineers (IEEE)
  1 IEEE 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
  2 IEEE 100: The Authoritative Dictionary of IEEE Standards Terms
  3 IEEE C2 National Electrical Safety Code
  4 IEEE C12.16: Solid-State Electricity Meters
  5 IEEE C37.13: Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures
  6 IEEE C37.20.1: Standard for Metal-Enclosed Low-Voltage Power Circuit-Breaker Switchgear
  7 IEEE C37.90.1: Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
  8 IEEE C57.12.28: Standard for Pad-Mounted Equipment - Enclosure Integrity
  9 IEEE C57.13: Standard Requirements for Instrument Transformers
E National Electrical Manufacturers' Association
  1 NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum)
  2 NEMA PB 2: Deadfront Distribution Switchboards
  3 NEMA PB 2.1: General Instructions for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards Rated 600 V or Less
  4 NEMA ST 20: Standard for Dry-Type Transformers for General Applications
  5 NEMA 12.10: Physical Aspects of Watthour Meters - Safety Standards
F National Electrical Testing Association (NETA)

1 NETA ATS: Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

G Underwriters' Laboratories (UL)

1 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3 UL 467: Grounding and Bonding Equipment
4 UL 486A: Wire Connectors
5 UL 486B: Wire Connectors
6 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
7 UL 489: Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures
8 UL 891: Switchboards
9 UL 1053: Ground-fault Sensing and Relaying Equipment
10 UL 1059: Terminal Blocks
11 UL 1558: Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear
12 UL 2735: Electric Utility Meters
13 UL 60947-1: Low-Voltage Switchgear and Controlgear – Part 1: General Rules
14 UL 60947-7-1: Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment - Terminal blocks for copper conductors
15 UL 60947-7-2: Low-Voltage Switchgear and Controlgear - Part 7-2: Ancillary Equipment - Protective Conductor Terminal Blocks for Copper Conductors

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
F Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
G Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:

1 Table of contents
2 A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals

6 Calibration procedures and intervals

C Submit shop drawings that include:
1 Complete fabrication details
2 Elevations and sections of enclosure(s)
3 Dimensions of enclosure(s)
4 Space available for conduits
5 Voltage, ampacity, short circuit, and enclosure ratings
6 Short circuit withstand ability of bus and lowest rated device,
7 Circuit schedule showing circuit number, device description, circuit breaker frame ampere rating and trip or fuse clip ampere rating
8 Termination lug size
9 Feeder identification
10 Single line diagram
11 Include both elementary diagram and terminal to terminal wiring diagrams.

D Electronic submittals shall be searchable

E The submittal shall be substantially complete for all items and equipment furnished under this section.

F Individual drawings and data sheets submitted at random intervals will not be accepted for review.

G Substitutions: Items of same function and performance shall be in conformance with Division 1. The Contractor shall provide a comparison of the proposed substitute with the specified equipment for review by the Engineer.

H Submit field test and operations check report for circuit breakers under provisions of Section 260500.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.

B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer's user and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A Square D Company
1 I-LINE
2 NQ
3 NF

B Equals
1 General Electric
2 Eaton/Cutler-Hammer
3 Approved equal

2.2 TYPE NQ PANELBOARD

A Interior
1 Shall be type NQ panelboard or approved equal rated for $240V_{AC}/48V_{DC}$ maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 600 amperes maximum.
2 Minimum short circuit current rating: 22000AIC as indicated in rms symmetrical amperes at $240V_{AC}$.
3 Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors suitable for plug-on or bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be copper. Bussing shall be copper as standard construction.
4 Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.

B Main Circuit Breaker
1 Main circuit breakers shall have an over-center, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40°C ambient environment. Thermal elements shall be ambient compensating above 40°C.
2 Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker which allows the user to simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.
3 Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
4 Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors 90°C rated wire, sized according to the 75°C temperature rating per CEC Table 310-16.

C Enclosures

1 Type 1 Boxes
   a Boxes shall be galvanized steel constructed in accordance with UL 50 requirements.
   b Boxes shall have removable end walls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
   c Box width shall be 20 in wide.
2 Type 1 Fronts
   a Front shall meet strength and rigidity requirements per UL 50 standards.
   b Front shall have cylindrical tumbler type lock with catch and spring-loaded stainless steel door pull. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.
   c All electrical busses shall be copper.
3 Type 3R, 5, and 12
   a Enclosures shall be constructed in accordance with UL 50 requirements
   b All doors shall be gasketed and equipped with a tumbler type vault lock. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.
   c Maximum enclosure dimensions shall not exceed 20 in wide and 6.5 in deep.

2.3 TYPE NF PANELBOARD

A Interior
1 Shall be type NF panelboard for 480Y/277V_{AC} maximum. Continuous main current ratings, as indicated on associated schedules, not to exceed 600 amperes maximum.
2 Minimum Short Circuit Rating: 14000 as indicated rms symmetrical amperes at 480Y/277V_{AC}.
3 Provide one (1) continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors limited to bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67. Bussing rated 100-400 amperes shall be copper. Bussing rated for 600 amperes shall be copper as standard construction.
4 Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have pre-formed twistouts covering unused mounting space.

B Main Circuit Breaker
1 Main circuit breakers shall have an over-center, trip-free, toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have a permanent trip unit with thermal and magnetic trip elements in each pole. Each thermal element shall be true rms sensing and be factory calibrated to operate in a 40°C ambient environment. Thermal elements shall be ambient compensating above 40°C.
2 Two- and three-pole circuit breakers shall have common tripping of all poles. Circuit breakers frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker which allows the user to

simultaneously select the desired trip level of all poles. Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

3 Circuit breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.

4 Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors. Lugs shall be suitable for 90°C rated wire, sized according to the 75°C temperature rating per CEC Table 310-16.

C Enclosures

1 Type 1 Boxes

a Boxes shall be galvanized steel constructed in accordance with UL 50 requirements.

b Boxes shall have removable end walls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.

2 Type 1 Fronts

a Front shall meet strength and rigidity requirements per UL 50 standards.

b Front shall have flat latch type lock with catch and spring loaded stainless steel door pull. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.

3 Type 3R, 5, and 12

a Enclosures shall be constructed in accordance with UL 50 requirements

b All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional trunk type latches. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock. A clear plastic directory card holder shall be mounted on the inside of door.

c Maximum enclosure dimensions shall not exceed 21 inches wide and 8 inches deep.

2.4 ENCLOSURE FINISH

A The completed enclosure shall be degreased and cleaned.

B After the cleaning process is finished, the enclosure shall be phosphatized.

C After the phosphatizing, the enclosure shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.

1 The minimum thickness of the paint film shall be 2.0 mils.

2 For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.

3 Paint film shall be uniform in color and free from blisters, sags, flaking and peeling

D Finish shall conform to UL 50 and UL 50E.

E Color shall be ANSI 61 Gray.

F Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

2.5 NAMEPLATES

Provide and install nameplates per Section 260500.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install all equipment per manufacturers' instructions.
B. Test all equipment per manufacturer's instructions.
C. Mount panelboards with center of top circuit breaker handle no higher than 78" above finished floor. Install flush mounted panelboards as indicated on architectural interior elevation drawings. Provide all necessary blocking, channels and other hardware for securing panelboards to wall, column or other parts of building structure.
D. Submit three copies of the certified list for permanent record to be referenced to in the event of failure of any motor either within or beyond expiration of the warranty period.

3.2 GROUNDING

A. Ground equipment per manufacturer's instructions, Section 260500, and applicable codes.
B. Minimize resistance from device to ground.
C. Resistance from device to ground shall not exceed 25 ohms.

3.3 LOAD BALANCING

If the contractor changes circuiting from the panel schedule on the approved plans, the contractor shall be responsible to ensure that the loads on any two phases differ by no more than 5%.

3.4 IDENTIFICATION

A Provide nameplate identifying panel on exterior of panel per requirements in Section 260500.
B Provide type written panel schedule on interior of door.

END OF SECTION

SECTION 26 27 00 LOW VOLTAGE (0-600V) DISTRIBUTION EQUIPMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for the following:

A Wiring devices
B Terminal cabinets
C Power distribution terminal blocks

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS

Published specification standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A California Building Code
B California Electrical Code
C Underwriters' Laboratories
  1 UL 20: General Use Snap Switches
  2 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
  3 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
  4 UL 111: Multi-Outlet Assemblies
  5 UL 231: Power Outlets
  6 UL 486A: Wire Connectors
  7 UL 486B: Wire Connectors
  8 UL 486E: Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
  9 UL 498: Attachment Plugs and Receptacles
  10 UL 514A: Metallic Outlet Boxes
  11 UL 514C: Nonmetallic Outlet Boxes, Flush-device Boxes, and Covers
  12 UL 514D: Cover Plates for Flush-mounted Wiring Devices
  13 UL 917: Clock Operated Switches
  14 UL 943: Ground Fault Circuit Interrupters
  15 UL 1681: Wiring Devices Configurations

16 UL 1773: Standard for Termination Boxes
17 UL 1953: Power Distribution Terminal Blocks
18 UL 2255: Standard for Receptacle Closures
19 UL 2682: Switch Rated Plugs and Receptacles

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Deliver, store and protect products under provisions of Section 016200.
F Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
G Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
H Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 Calibration procedures and intervals
7 A complete set of drawings for any special items
8 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.
9 Wiring diagrams
10 Illustrations and scale drawing of the racks, equipment layouts etc.
11 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
12 The contractor shall also submit a copy of his valid state contractor's license and show proof that he is a distributor of the submitted equipment.
C Electronic submittals shall be searchable
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.
F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A. Submit operation and maintenance manuals in accordance with Section 260000.
B. The manuals shall, at minimum, include the following:
   1. Manufacturer (including contact information)
   2. Model number
   3. Manufacturer's data sheets – When data sheets include more than one model the model(s) used shall be noted
   4. Manufacturer's user and maintenance manual(s), including trouble-shooting guidelines
   5. Configuration settings
   6. Wiring diagrams
   7. Voltage ratings
   8. Current ratings
   9. List of capabilities
   10. Environmental ratings
   11. NEMA enclosure type
   12. Maintenance requirements
   13. Installation instructions
   14. Repair instructions
C. Provide manuals in one of the following formats
   1. Three hardcopies
   2. PDF

PART 2 – PRODUCTS

2.1 WIRING DEVICES

A. Wall (Local) Switches
   1. Totally enclosed
   2. AC rated
   3. 20A rated
   4. Silent type, unless noted otherwise on the plans
   5. Manufacturers
      a. Hubbell Premise Wiring
      b. Leviton
   6. Specification Grade
B. Receptacles
   1. Duplex receptacles shall be 20A, 125V_{AC} rated, 3-wire, grounded
   2. Receptacle shall include a LED that indicates it has power.
   3. Receptacles shall be tamperproof.
   4. Manufacturers
      a. Hubbell Premise Wiring
      b. Leviton
   5. Specification Grade
   6. Exterior receptacle plates shall have steel, weatherproof, vandal-resistant while-in-use cover with key lockable/locking cover with keys to match owner standards.
   7. All automatically switched receptacles shall be marked per 2016 CEC 406.3(E).
C. Other special purpose receptacles shown on Drawings shall be of same quality.

D GFI receptacles shall self test every 3 seconds and indicate if the GFI protection has passed or failed the test.

E Wall Plates:
- 1 Commercial: Satin finish stainless steel
- 2 Educational and medical: Satin finish stainless steel
- 3 Medical: Satin finish stainless steel
- 4 Residential:
  - a Material: Nylon
  - b Color: Match wall color

F Switch and receptacle colors shall be as noted below unless otherwise specified.
- 1 Job type dependant:
  - a Educational and medical: Gray
  - b Commercial: White
  - c Residential: Match wall color
- 2 Feature type dependant (not job type dependant):
  - a Isolated Ground (IG) receptacle: Orange
  - b Equipment on emergency system: Red
  - c Receptacle with surge suppression: Blue
  - d Isolated ground receptacles with feature dependant color (other than orange) shall have orange triangle.
- 3 Follow the facility has a color code scheme if the facility has one. Verify with owner.

2.2 TERMINAL CABINETS

A Construction
- 1 Fabricated from code gauge steel, size as indicated on drawings, with flush latch and concealed hinges and mounting screws.
- 2 Enclosure for flush mounted cabinets shall be designed for flush mounting.
- 3 Enclosure for surface mounted cabinets shall be designed for surface mounting.

B Where size is not indicated, the minimum size shall be 24 inches wide x 30 inches high x 4 inches deep.

C Cabinet shall be Square D “Mono-Flat Fronts”, or approved equal.

D Terminal cabinets shall include a backboard at inside back of cabinet.
- 1 The backboard shall be 3/4" inch thick plywood
- 2 Paint backboard with 3 coats of fire retardant paint.

E Provide and install one terminal point for each wire within the terminal cabinet.

F NEMA type:
- 1 Interior, non-corrosive, non-hazardous (classified) locations: NEMA 1
- 2 Exterior locations with vents: NEMA 3R
- 3 Cooled enclosures: NEMA 4
- 4 Enclosures containing electronics in dusty areas or outdoors: NEMA 4
- 5 Enclosures in hazardous (classified) locations: NEMA 4 or 4X (corrosive locations) listed for hazardous classification
- 6 Enclosure in corrosive locations: NEMA 4X
- 7 All seams on NEMA 3R, 4, and 4X enclosures shall be continuously welded with welds ground smooth.

G Coating
- 1 The completed enclosure shall be degreased and cleaned.
- 2 After the cleaning process is finished, the enclosure shall be phosphatized.

3 After the phosphatizing, the enclosure shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.
   a The minimum thickness of the paint film shall be 2.0 mils.
   b For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.
   c Paint film shall be uniform in color and free from blisters, sags, flaking and peeling
4 Finish shall conform to UL 50 and UL 50E.
5 Color shall be ANSI 61 Gray.
6 Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

2.3 POWER DISTRIBUTION TERMINAL BLOCKS

A Power distribution terminal blocks (PDTB) shall be finger-safe, NEMA 1 type.
B Conducting material shall be copper.
C Current rating and short circuit rating of PDTBs shall be no lower than upstream overcurrent protective device.
D Terminals
   1 Each terminal shall be screw type and be designed for wire size connecting to it.
   2 PDTB shall have one terminal for each wire connected to it on both load and line sides.
E Load wire sizes and OCPD shall comply with CEC 240.21(B) and 240.92(B) as well as all other applicable codes.
F PDTBs shall have provisions for panel or DIN rail mounting.
G PDTBs shall be mounted within enclosure unless otherwise noted.

2.4 NAMEPLATES

Provide and install nameplates per Section 260500.

PART 3 – EXECUTION

3.1 GENERAL

A Electric system layouts indicated on the Drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of cable and wiring and the locations of outlets by the structure and equipment served. Dimensions shall be taken from Architectural Drawings.
B Consult all other Drawings. Verify scales and report any dimensional discrepancies or other conflicts to architect, or engineer if no architect is involved, before submitting bid.
C Home runs to panelboards are indicated as starting from the outlet nearest the panel and continuing in the general direction of that panel. Continue such circuits to the panel as though the routes were completely indicated. Terminate homeruns of signal, alarm, and communications system in a similar manner.
D Avoid cutting and boring holes through structure or structural members wherever possible. Obtain prior approval of Architect and conform to structural requirements when cutting or boring the structure is necessary or permitted.

E Furnish and install necessary hardware, hangers, blocking, brackets, bracing, runners, required for equipment specified under this section.

F Provide necessary backing required to insure rigid mounting of outlet boxes.

G Outlet boxes shall be plumb.

H Back of wall plates shall be flush with wall finish. Gaps between wall plates and wall or wall plates not parallel to wall are not acceptable.

3.2 CONNECTIONS TO EQUIPMENT

A General:

1 Furnish and install required power supply conduit and wiring to equipment. See below for other wiring required.

2 Install rough-in work for equipment from approved shop drawings to suit the specific requirements of the equipment.

3 Furnish and install magnetic motor starters that are shown on the Drawings or specified under other divisions to be furnished under this division of work. Verify equipment nameplate ratings prior to installation and furnish adequately rated starters for the loads.

4 Furnish and install manual thermal protection for motors not integrally equipped with thermal protection.

5 Furnish and install 120V power to each control panel and time switch requiring a source of power to operate.

B Heating, ventilating, and air conditioning equipment:

1 Coordinate with mechanical contractor for sizes, locations and details of motors, heating units, and control requirements.

2 Provide required power supply conduit and wiring to equipment.

3 Provide a suitable means of disconnect switch immediately ahead of and adjacent to each motor and appliance unless the motor or appliance is located adjacent and within sight of the service panelboard, circuit breaker or switch at a distance allowed by codes. Verify equipment nameplate current ratings prior to installation. Provide a disconnect means at each magnetic motor starter.

4 Provide magnetic motor starters required under this division of work.

5 Provide manual thermal protection for motors not integrally equipped with thermal protection.

6 Line and low voltage temperature control and interlock wiring, conduit, and required connections are a part of other divisions unless specifically shown or noted on the Drawings as to be furnished under this section.

7 Provide 120V power supply to control panels, time switch furnished and installed under other divisions of work.

8 Furnish and install 120V power to each duct detector scheduled for operation of fire dampers or shut down of mechanical equipment. Coordinate the exact quantity and locations with the mechanical drawings.

C Plumbing and other contractor-furnished and Owner-furnished equipment:

1 Required power and control conduit, wiring and connections are included under this section of the work. Control sensing and alarm devices will be furnished under the respective section of the contract supplying the equipment unless noted otherwise. These devices will be located in pipes, ducts, vessels, tanks, etc., and will be mounted in a place by the Contractor furnishing the devices. Other devices shall be mounted under this section of the work.

2 Control panels for packaged equipment will be furnished under the respective section of the contract supplying the equipment unless otherwise noted. Installation and connection of the control panels are under this section of the work.

3.3 IDENTIFICATION

Refer to Section 260500.

END OF SECTION

SECTION 26 28 00 LOW VOLTAGE (0-600V) CIRCUIT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 SECTION INCLUDES

Materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for overcurrent protective devices

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

Published specification standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A California Building Code
B California Electrical Code
C Institute of Electrical and Electronic Engineers
  1 IEEE 1015: Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems
  2 IEEE 1458: Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded Case Circuit Breakers for Industrial Applications
D Underwriters' Laboratories
  1 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
  2 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
  3 UL 98: Enclosed and Dead-front Switches
  4 UL 244A: Solid-state Controls for Appliances
  5 UL 363: Knife Switches
  6 UL 489: Molded-case Circuit Breakers, Molded-case Switches, and Circuit Breaker Enclosures
  7 UL 1066: Standard for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
  8 UL 2367: Standard for Solid State Overcurrent Protectors
  9 UL 60947-7-3: Low-Voltage Switchgear and Controlgear - Part 7-3: Ancillary Equipment - Safety Requirements for Fuse Terminal Blocks

1.4 QUALITY ASSURANCE

A Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B Supply equipment and accessories new, free from defects.
C Equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D Items of a given type shall be the products of the same manufacturer.
E Deliver, store and protect products under provisions of Section 016200.
F Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.
G Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.
H Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 A complete set of drawings for any special items
7 Wiring diagrams
C Electronic submittals shall be searchable
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.
F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Manufacturer’s data sheets – When data sheets include more than one model the model(s) used shall be noted
4 Manufacturer’s programming, user, and maintenance manual(s), including trouble-shooting guidelines
5 Configuration settings
6 Wiring diagrams
7 Voltage ratings
8 Current ratings
9 Calibrated range

10 List of capabilities
11 Environmental ratings
12 NEMA enclosure type
13 Maintenance requirements
14 Installation instructions
15 Repair instructions

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 CIRCUIT BREAKERS

A Circuit breakers shall be constructed in accordance with the following standards:
1 UL 489 or UL 1066
2 Federal Specification W-C-375B/GEN
3 NEMA AB1
4 CSA 22.2, No. 5-M91
5 IEC 157-1
6 BS 4752

B Construction
1 Circuit breakers shall be constructed using glass reinforced polyester insulating material providing superior dielectric strength.
2 Current-carrying components shall be completely isolated from the handle and the accessory mounting area.
3 Breaker contact material shall be a non-weldable silver alloy.
4 Breakers shall have arc-extinguishing chutes.
5 Circuit breakers shall have an over-center, trip-free, toggle operating mechanism which will provide quick-make, quick-break contact action.
6 Multiple pole breakers shall have a common trip element and a single operating handle.
7 Circuit breakers for branch circuits shall be molded case
8 Circuit breakers shall have bolt-on/plug-on type bus connectors.

C Trip type
1 Circuit breakers having a frame size of 150 amperes or less shall have thermal magnetic non-interchangeable, trip-free sealed trip units.
2 Circuit breakers with a frame size of 175 amperes to 1200 amperes shall have interchangeable thermal and adjustable magnetic trip elements.

D There shall be two forms of visible trip indication.
1 The breaker handle shall reside in a position between ON and OFF.
2 In addition, there shall be a red trip indicator appearing in the clear window of the circuit breaker housing.

E Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the panelboard schedules.

F Circuit breakers faceplates shall be marked with the following
1 Rated ampacity
2 UL and IEC certification standards
3 Applicable voltage systems and corresponding AIR ratings

G Lugs shall be UL Listed to accept solid or stranded copper and aluminum conductors. Lugs shall be suitable for 90°C rated wire, sized according to the 75°C temperature rating per CEC Table 310-16.

H Branch circuit breakers rated 30 amperes and below shall be UL Listed to accept 60°C rated wire.

I The interrupting capacity of all main and feeder branch circuit breakers shall be a minimum of 42,000A_{RMS} symmetrical amperes.

J All circuit breakers feeding HVAC units, motors, or circuit breakers supplying loads other than convenience receptacles or lights shall have lockout devices.

K Standard circuit breakers up to 250A at 600V_{AC} shall be UL Listed with HACR ratings.

L All circuit breakers feeding 120V, 15A and 20A branch circuits in dwellings shall be AFCI.

M Circuit breakers with shunt-trip or low voltage release shall be switch duty rated.

N All fixed trip circuit breakers 1200A or greater and adjustable trip circuits breakers with a maximum rating 1200A or greater shall be equipped with one of the following methods to reduce arc flash energy.

1 Zone selective interlocking

2 Differential relaying

3 Arc flash detection and mitigation system in panel/board with the 1200A circuit breaker, refer to Section 260930

2.2 SAFETY SWITCHES (DISCONNECTS)

A Switches shall be heavy duty type

B Minimum voltage rating shall be 600V.

C Minimum Size

1 Switches for disconnecting motors shall be sized for the horsepower of for motor(s).

2 All switches shall be sized per the overcurrent protective device protecting the switch.

D Construction

1 NEMA 1 for indoors

2 NEMA 3R or NEMA 4 for outdoors

3 Handle shall be lockable in the off/disconnected/open position.

E The switch shall include a barrier between the fuse section and the switch section with separate doors for each section. The entire fuse section shall be de-energized when the switch is in the off position.

F Switch shall be equivalent to Square D H-rated series.

G Finish: The entire enclosure shall be finished as follows.

1 Degreasing

2 Cleaning

3 Phosphatizing

4 Electrostatic deposition of polymer polyester powder coating followed by baking to produce a hard, durable finish.

a The minimum thickness of the paint film shall be 2.0 mils.

b Paint film shall be uniform in color and free from blisters, sags, flaking and peeling

5 Finish shall conform to UL 50 and UL 50E.

6 Color shall be ANSI 61 Gray.

7 Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating

SECTION 26 50 00 LIGHTING

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes materials, equipment fabrication, installation and tests in conformity with applicable codes and authorities having jurisdiction, for lighting fixtures and installation.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
- 1 Section 013000: Administrative Requirements
- 2 Section 013300: Submittal Procedures
- 3 Section 014000: Quality Requirements
- 4 Section 016000: Product Requirements
- 5 Section 017000: Execution and Closeout Requirements
- 6 All other included sections under Division 1

B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A. Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.
B. California Electrical Code
C. Illuminating Engineering Society: The Lighting Handbook
D. Underwriters' Laboratories
1. UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2. UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3. UL 924: Emergency Lighting and Power Equipment
4. UL 1598: Luminaires
5. UL 2575: Standard for Lithium Ion Battery Systems for Use in Electric Power Tool and Motor Operated, Heating and Lighting Appliances
6. UL 8750: Light Emitting Diode Equipment for Use in Lighting Products

1.4 QUALITY ASSURANCE

A. Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.
B. Supply equipment and accessories new, free from defects.
C. Supply equipment and accessories in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.
D. Items of a given type shall be the products of the same manufacturer.
E. Ship equipment in its original packages to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

F. Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

G. Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

1.5 SUBMITTALS

A. Submit under provisions of Section 013000 or 013300.

B. Submittals shall include the following:

1. Table of contents
2. A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3. Part numbers
4. Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5. Maintenance instructions and intervals
6. Calibration procedures and intervals
7. A complete set of drawings for any special items
8. Wiring diagrams
9. Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.

C. Electronic submittals shall be searchable

D. The submittal shall be substantially complete for all items and equipment furnished under this section.

E. Individual drawings and data sheets submitted at random intervals will not be accepted for review.

F. Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

G. Pole mounted fixtures, including complete data on the pole material, finish, handholes, anchoring and attachment. Support method shall be submitted for interior fixtures weighing more than fifty (50) pounds.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.

B The manuals shall, at minimum, include the following:

1 Manufacturer (including contact information)
2 Model number
3 Programming manual (where applicable)
4 Wiring diagrams
5 Trouble-shooting guidelines (where applicable)
6 Voltage ratings
7 Current ratings
8 Calibrated range (where applicable)
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions (where applicable)

C Provide manuals in one of the following formats

1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 GENERAL

A. Furnish and install all fixtures complete, including lamps, ballasts, whips, conductors, etc. and ready for service.
B. Fixture Designation: Fixtures are designated on Drawings by means of letters. See Lighting Fixture Schedule. Where only one (1) fixture designation appears in a room or area, that designation applies to all fixtures in that room or area.
C. Tandem wired units acceptable where appropriate.
D. Manufacturers and models for fixtures, ballasts, and lamps shall be as shown on the fixture schedule or approved equal.

2.2 FIXTURES

A Linear fixtures
1 Fixture housings shall be steel.
2 Housing shall be painted after fabrication with white, electro-statically deposited paint. Housing shall be completely covered with paint to prevent corrosion.
B All lenses shall be clear, prismatic, 0.125", K12 pattern, acrylic lenses.
C Louvers shall be semi-specular aluminum.
D Open can light reflectors shall be semi-specular aluminum.
E Fixtures installed in gyms and similar rooms, locker rooms, storage rooms, and warehouses shall include stainless steel wireguards to protect fixture from damage.
F Fixtures shall direct a minimum of 75% of light within zone below 30 degrees below horizontal.

2.3 LAMPS

A. All LED fixtures shall have a color rendering index (CRI) of 0.8 and color temperature of 4000°K unless otherwise noted on plan.

2.4 EXIT SIGNS

A. All exit signs shall be connected to an unswitched source.
B. Colors
1. Face shall be white.
2. Letters and arrows shall be green.
C. Exit signs shall have arrows to indicate direction of exit where necessary.
D. All exit signs shall include batteries to provide 90 minutes of illumination in the event of a power outage.

2.5 FIXTURE HANGERS AND SUPPORTS

A. Provide proper supports and mounting accessories, such as hangers, stems, yokes, plaster frames, etc., as required by the type of ceiling installed.

B. Where pendant mounted fixtures with stems are specified, provide swivel canopies or ball aligners in order to hang plumb regardless of ceiling slope.
C. Entire assemblies shall comply with state earthquake resistance/ bracing guidelines.

2.6 POLES

A. The minimum pole shall be capable of supporting the weights and effective projected areas listed below in 100 MPH winds:
   1. 20 foot tall: W_{MAX}=390lbs, EPA_{Max}=15.6FT^2
   2. 25 foot tall: W_{MAX}=495lbs, EPA_{Max}=19.8FT^2
   3. 30 foot tall: W_{MAX}=550lbs, EPA_{Max}=22.0FT^2
   4. 35 foot tall: W_{MAX}=363bs, EPA_{Max}=14.5FT^2
   5. 39 foot tall: W_{MAX}=475lbs, EPA_{Max}=19.0FT^2
   6. 45 foot tall: W_{MAX}=475lbs, EPA_{Max}=19.0FT^2
   7. 50 foot tall: W_{MAX}=340lbs, EPA_{Max}=13.6FT^2
B. Anchoring
   1. Concrete base depth and anchor bolt length shall be as shown on plans.
   2. In no case shall the concrete base embedment depth be less than 20% of the pole height.
   3. Minimum anchor bolt length is 10% of the pole height.
   4. Minimum anchor bolt diameter is 1 inch.
C. Coordinate with architect for pole color.
D. Poles shall be made of ATSM A595, Grade A steel.

2.7 GROUNDING

A Fixtures shall have factory installed grounding studs.
B All fixtures shall be capable of being grounded.

2.8 LIGHTING CONTROLS

Refer to Section 265700.

PART 3 – EXECUTION

3.1 GENERAL

A. Verify ceiling type and conditions. Order fixtures designed for conditions and the type of ceiling installed.
B. Architectural reflected ceiling plans shall be used to determine exact locations of lighting fixtures.
C. Determine exact location and height of fixtures by the structural and mechanical limitations of the building. Install fixtures in such a manner as to avoid such obstructions and to give proper illumination result. Verify layouts with architect.
D. All recessed lighting fixtures shall be wired from adjacent junction boxes utilizing 6' flexible metal conduit to permit future fixture relocation. Outlet box for surface or stem mounted fixtures shall be provided with fixture stud as well as tapped and drilled canopy covers. All outlets shall finish flush with walls or ceiling except where in ceiling tiles, locate these in the center of a tile or at the intersection of four (4) tiles.

E. All building mounted fixtures shall be supported from the building structural members. Provide all necessary blocking and hardware so that fixtures installed suspended below grid type ceiling shall be supported independently of the grid system at a minimum of four (4) points per 4' long fixture.

F. Minimum mounting provisions for closed ceiling (surface) mounted fluorescent lighting fixtures in ceilings other than grid type shall be as follows:

1. 4' long fixture body: By a pair of 3/8" machine bolts separated by a maximum distance possible and located 4 inches in from each end of fixture - total of four (4) bolts per fixture.

G. Support for fixtures installed in suspended ceilings shall conform to Section 4701 of Title 24, Part 2.

H. When installed in grid type ceiling, a slack #12 gauge galvanized tie wire permanently attached to the structure shall be provide at four (4) corners of each 4' long fixture.

I. At fire rated ceiling, provide sheet rock at top and at all sides of recessed mounted lighting fixtures.

J. Ground all fixtures.

END OF SECTION

SECTION 26 57 00 LIGHTING CONTROLS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Materials, equipment fabrication, installation and tests in conformity with equipment applicable to this project, applicable codes and authorities having jurisdiction.
B. The work to be provided under these specifications consists of furnishing and installing a complete and operable lighting control system.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
  1 Section 013000: Administrative Requirements
  2 Section 013300: Submittal Procedures
  3 Section 014000: Quality Requirements
  4 Section 016000: Product Requirements
  5 Section 017000: Execution and Closeout Requirements
  6 All other included sections under Division 1
B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

Published specifications standards, tests or recommended methods of trade, industry or government organizations apply to work in this section as cited in Section 260000.

A California Electrical Code
B Underwriters' Laboratories
  1 UL 20: General Use Snap Switches
  2 UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
  3 UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
  4 UL 67: Panelboards
  5 UL 98: Enclosed and Dead-front Switches
  6 UL 467: Grounding and Bonding Equipment
  7 UL 486A: Wire Connectors
  8 UL 486B: Wire Connectors
  9 UL 489: Molded-case Circuit Breakers, Molded-case Switches, and Circuit Breaker Enclosures
  10 UL 773A: Nonindustrial Photoelectric Switches for Lighting Control
  11 UL 917: Clock Operated Switches
  12 UL 60730-2-7: Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Timers and Time Switches

1.4 QUALITY ASSURANCE

A. Equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.

B. Supply equipment and accessories new, free from defects.
C. Equipment and accessories in compliance with the applicable standards listed in Article 1.1 of this section and with applicable national, state and local codes.
D. Items of a given type shall be the products of the same manufacturer.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.
B Submittals shall include the following:
1 Table of contents
2 A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3 Part numbers
4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 Calibration procedures and intervals
7 A complete set of drawings for any special items
8 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.
9 Wiring diagrams
10 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.
C Electronic submittals shall be searchable
D The submittal shall be substantially complete for all items and equipment furnished under this section.
E Individual drawings and data sheets submitted at random intervals will not be accepted for review.
F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.
B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model numbers
3 Programming manuals
4 Wiring diagrams
5 Trouble-shooting guidelines
6 Voltage ratings
7 Current ratings
8 Calibrated range (where applicable)
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions
C Provide manuals in one of the following formats
1 Three hardcopies

2 PDF

1.7 ABBREVIATIONS

A. ATC Astronomical Time Clock
B. LCP Lighting Control Panel
C. LCS Lighting Control System

PART 2 – PRODUCTS

2.1 GENERAL

A. The LCP size and quantity; and relay quantity shall be sufficient for all circuits with 25% spare circuits.
B. Enclosures shall be NEMA 1 for interior, dry locations and NEMA 3R or NEMA 4 for exterior or wet locations.
C. Energy Management Systems
   1. All LCPs with 12 or more switch legs shall be capable of communications with an Energy Management System via a minimum of one of the following protocols.
      a. BACnet
      b. LONWorks
      c. Modbus
   2. Provide and install a communications gateway if LCP/LCS and EMS system do not have a common protocol.
D. All equipment shall be rated for voltage used.

2.2 BUILDING LIGHTING CONTROL SYSTEMS

A. Building lighting control systems shall be Wattstopper Digital Lighting Management system and consist of the following, except as allowed in Part B.
   1. Lighting control systems shall have the following capabilities and features.
      a. Networkable (TCP/IP interface)
      b. Scheduling controls
      c. Astronomical time clock
      d. Manual switches interfaces
      e. Photocell interface
   2. Controllers where dimming is required:
      a. System controller
         1. 100 or fewer sub-controllers and no more than three segments: Wattstopper LMSM-3E
         2. More than 100 sub-controllers or 3 segments: Wattstopper LMSM-6E
      b. Switch leg relay sub-controller where dimming is required
         1. Wattstopper LMRC-210 series for 0-10V_{DC} dimming
         2. Wattstopper LMRC-220 series for line voltage dimming
      c. Switch leg relay sub-controller where dimming is not required: Wattstopper LMRC-100 series
      d. Provide Wattstopper LMBC-300 network bridge for each sub-controller.
   3. Switches: Wattstopper LMSW-100 series

4. Dimmers: Wattstopper LMDM-101
5. Switches and dimmers in multiple stall restrooms or where noted on plans shall have locking, stainless steel covers (Legrand #WP26L or approved equal).
6. Motion sensors (All motion sensors shall be dual technology [passive infrared and ultrasonic]).
    a. Ceiling mounted: Wattstopper LMDC-100
    b. Wall mounted: Wattstopper LMDX-100

2.3 OTHER DEVICES

A. On/off Switches
    1. SPST switch for 120V or 277V
    2. DPST switch for 208V, 240V, or 480V
B. Switches for use with sport lighting shall be 3 position, maintained position switch for on-off-automatic control.
C. Astronomical time switch: Wattstopper RT-200
D. Clock input
    1. 120V
    2. Six (6) months cumulative battery back-up
    3. SPDT dry contract
    4. Enclosure shall be fiberglass, suitable for outdoor/indoor UL listed.
    5. Digital LED display.
    6. Tork model K801Z or equal.
E. Lighting Relays
    1. Electrically operated, mechanically held, specifically designed as lighting contactors
    2. 20A, 480V_{AC} rated, with 120V_{AC} controls unless otherwise specified
    3. Minimum of 4-pole
    4. Relays shall be mounted on shock absorbers within an acoustically treated enclosure to eliminate make and break noise.
    5. Install the relays in code gage cabinets 24”W x 36”H x 6”D with ¾” fire rated plywood backboards.
    6. Products: GE CR460 series, ASCO 917 series, or equivalent
    7. Contact response time shall be no more than 5 milliseconds.
F. Lighting Relay panels Wattstopper or indicated on plan.

PART 3 – EXECUTION

3.1 COMPATIBILITY

The installing contractor shall insure to the Owner that all components installed are compatible with all other components within the lighting control system.

3.2 INSTALLATION PRACTICES

A. All equipment shall be installed in a neat and workmanlike manner and to the satisfaction of an authorized representative.
B. All equipment power wiring and grounding shall conform to the Califonia Electrical Code and applicable local codes. Electronics equipment shall be grounded using a No. 6 solid copper wire.

C. Cable shall be adequately supported, and connectors specifically designed for the type cable in use shall be installed.

3.3 SYSTEM PROOF OF PERFORMANCE

A. Upon completion of the system installation, it shall be the responsibility of the contractor to perform the necessary adjustments.

B. The system shall be physically inspected by an authorized representative of the customer to assure that all equipment is installed in a neat and workmanlike manner as called for by the plans and specifications.

C. Before the contract shall be considered completed, the contractor shall conduct an operating test for approval. The system shall be demonstrated to operate in accordance with the requirements of these specifications. The test shall be performed in the presence of an authorized representative of the Owner. The contractor shall furnish all equipment and personnel required for the tests.

D. Should such a demonstration of performance show that the system does not perform as intended, the contractor shall make all necessary changes or adjustments and a second performance demonstration shall be arranged.

E. Should a second performance demonstration fail, the contractor agrees to correct the system deficiencies under the supervision of the owner's technical staff at no cost to the owner.

F. Title 24 acceptance testing shall be performed by a technician licensed by an Acceptance Test Technician Certification Provider.

END OF SECTION

SECTION 27 11 00 COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes material and workmanship requirements for intermediate data frames (IDFs), main data frames (MDFs), and signal and communications terminal backboards (SCTBs) including, but not limited to, cabinets, racks, patch panels, cable terminations, patch cables, and power distribution.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
- 1 Section 013000: Administrative Requirements
- 2 Section 013300: Submittal Procedures
- 3 Section 014000: Quality Requirements
- 4 Section 016000: Product Requirements
- 5 Section 017000: Execution and Closeout Requirements
- 6 All other included sections under Division 1

B All included sections under Division 26
C All included sections under Division 27
D All included sections under Division 28
E Plans
F Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A. Governing Codes and Conflicts: If the requirements of the Construction Documents exceed those of the governing codes and regulations, then the requirements of the Construction Documents shall prevail. Where a conflict exists, the governing codes and ordinances shall supersede all other requirements.
B. ANSI: American National Standards Institute (ANSI)
C. CEC: California Electrical Code
D. Electronic Components Association (ECA)
   1. ECA-310-E: Cabinets, Racks, Panels, and Associated Equipment
E. Institute of Electrical and Electronic Engineers (IEEE)
   1. IEEE 802.3: IEEE Standard for Ethernet
   2. IEEE 802.3ad: Link Aggregation
   3. IEEE 802.3ae: 10 Gigabit Ethernet
   4. IEEE 802.3af: Power over Ethernet
   5. IEEE 802.3an: 10 Gigabit Ethernet on Twisted Pair Copper Cable (10G Base T)
   6. IEEE 802.3aq: 10 Gigabit Ethernet on FDDI-Grade Multimode Fiber (10G Base LRM)
   7. IEEE 802.3at: Enhanced Power over Ethernet
F. Telecommunications Industries Association (TIA)
   1. TIA-455: General Requirements for Standard Test Procedures for Optical Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components
   2. TIA-472-0000: Generic Specification for Fiber Optic Cable

3. TIA-472-C000: Sectional Specification for Fiber Optic Communications Cable for Indoor Use
4. TIA-472-D000: Sectional Specification for Optical Fiber Outside Plant Communications Cables
5. TIA-472-E000: Sectional Specification for Indoor-Outdoor Optical Fiber Cable
6. TIA-472-F000: Sectional Specification for Optical Fiber Drop Cable
7. TIA-492-0000: Generic Specification for Optical Fibers
8. TIA-492-AAAD: Detailed Specification for 850-nm, Laser Optimized, 50µm Core Diameter / 125µm Cladding Diameter, Class IA Graded-Index, Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fibers
9. TIA-492-CAAB: Detailed Specification for Class IVA, Dispersion-Unshifted, Single-Mode, Optical Fibers with Low Water Peak
10. TIA-526: Standard Test Procedures for Fiber Optic Systems
11. TIA-526-2: Effective Transmitter Output Power Coupled into Single-Mode Fiber Optic Cable
12. TIA-526-14: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
13. TIA-526-19: Optical Signal-to-Noise Ratio Measurement Procedures for Dense Wavelength – Division Multiplexed Systems
14. TIA-568-C: Commercial Building Telecommunications Standard
15. TIA-568-C.0: Generic Telecommunications Cabling for Customer Premises
16. TIA-568-C.1: Commercial Building Telecommunications Cabling Standard
17. TIA-568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standards
18. TIA-568-C.3: Optical Fiber Cabling Components Standard
19. TIA-568-C.3-1 Addendum 1: Addition of OM4 Cabled Optical Fiber and Array Connectivity
20. TIA-569-C: Commercial Building Standard for Telecommunications Pathways and Spaces
21. TIA-604: Fiber Optic Connector Intermateability Standards
22. TIA-606-B: Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
23. TIA-607-B: Commercial Building Grounding and Bonding Requirements for Telecommunications
24. TIA-758-B: Customer Owned Outside Plant Telecommunications Infrastructure Standard
25. TIA-TSB-36: Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted-Pair Cables
26. TIA-TSB-62: Informative Test methods for Fiber-Optic Fibers, Cables, Opto-Electronic Sources and Detectors, Sensors, Connecting and Terminating Devices, and Other Fiber-Optic Components
27. TIA-TSB-63: Reference Guide for Fiber Optic Test Procedures
28. TIA-TSB-149: Generic Workmanship Guidelines for Fiber Optic Connector Interoperability
29. TIA-TSB-4979: Practical Considerations for Implementation of Encircled Flux Launch Conditions in the Field

G. Underwriters Laboratories, Inc.
1. UL 50: Enclosures for Electrical Equipment, Non-environmental Considerations
2. UL 50E: Enclosures for Electrical Equipment, Environmental Considerations
3. UL 489A: Circuit Breakers for Use in Communications Equipment
4. UL 497: Protectors for Paired-conductor Communications Circuits

5. UL 497A: Secondary Protectors for Communications Circuits
6. UL 497B: Protectors for Data Communications and Fire Alarm Circuits
7. UL 497C: Protectors for Coaxial Communications Circuits
8. UL 497D: Component Secondary Protectors for Communications Circuits Used With Specified Voltage Suppression
9. UL 497E: Protectors for Antenna Lead-In Conductors
10. UL 1449: Surge Protective Devices
11. UL 1651: Standard for Optical Fiber Cable
12. UL 1655: Standard for Community-Antenna Television Cables
13. UL 1690: Standard for Data-Processing Cable
14. UL 1778: Uninterruptible Power Systems
15. UL 1801: Power Distribution Centers for Communications Equipment
16. UL 1863: Communications Circuit Accessories
17. UL 1977: Component Connectors for Use in Data, Signal, Control, and Power Applications
18. UL 2024: Standard for Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies
19. UL 2269: Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes
20. UL 2416: Audio/Video, Information, and Communication Technology Equipment Cabinet, Enclosure, and Rack Systems
21. UL 2564: Low Voltage Surge Withstand Telecommunications Overcurrent Protector Components
22. UL 2566: Low Voltage Surge Withstand Telecommunications Fuses
23. UL 2567: Low Voltage Surge Withstand Telecommunications Polymer Positive Temperature Coefficient Thermistor (PPTC)
24. UL 2569: Low Voltage Surge Withstand Telecommunications Line Feed Resistor
25. UL 2570: Low Voltage Surge Withstand Telecommunications Electronic Current Limiters
26. UL 60950-1: Information Technology Equipment Safety – Part 1: General Requirements
27. UL 60950-22: Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors
28. UL 62368-1: Audio/video, information and communication technology equipment - Part 1: Safety requirements

1.4 QUALITY ASSURANCE

A Contractor requirements:

1 The Contractor shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.

2 Project Manager

a The Project Manager shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.

b The contractor shall make the project manager available to the Owner/Owner's Representative before the start of this project for an interview. This person must be deemed acceptable by the Owner and/or their Representative before work can begin.

c Project Manager will be required to be available for scheduled on site project meetings at no additional cost to the Owner.

d Project Manager will be required to be available to meet on site with the Owner/Owner's representative with a minimum of 24 hours notice for non- emergency issues, and a minimum of 4 hours for emergency issues at no additional cost to the Owner.

3 The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context 'good quality' means the work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

4 The Contractor shall provide all necessary materials and labor for a complete, functional Telecommunications cabling infrastructure in accordance with all applicable standards and the Construction Documents.

B Material requirements

1 All material and equipment to be installed on this project will be new and free from defects.

2 Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

3 New material shall meet the following requirements.

a Manufactured within one year of the installation date.

b Undamaged

c Not previously installed

d Delivered to jobsite in original packaging

e No corrosion or other degradation of material

f In factory condition

g Unmodified

4 If used material or equipment has been installed on this project the Contractor shall replace said materials and/or equipment with new products at no additional cost to the Owner.

5 Equipment and accessories shall be in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.

6 Items of a given type shall be the products of the same manufacturer.

7 Deliver, store and protect products under provisions of Section 016200.

8 Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

9 Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

10 Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

C Contractor shall warranty all materials, equipment, and workmanship for a minimum of one (1) year.

1 Warranty shall provide repair/replacement of all defective or improperly installed materials at no additional cost to the Owner (including all costs to repair or replace the item(s)).

2 Contractor shall provide a competent service technician and new materials to repair/replace defective items no later than 24 hours after notification.

D The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context 'good quality' means the work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

E The Contractor shall provide all necessary materials and labor for a complete, functional Telecommunications cabling infrastructure in accordance with all applicable standards and the Construction Documents.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.

B Submittals shall include the following:

1. Table of contents
2. A complete set of detailed manufacturer's specifications describing and illustrating all standard and special components and materials
3. Part numbers
4. Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5. Maintenance instructions and intervals
6. A complete set of drawings for any special items
7. A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.
8. Wiring diagrams
9. Illustrations and scale drawing of the racks, equipment layouts etc.
10. Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.

C Electronic submittals shall be searchable

D The submittal shall be substantially complete for all items and equipment furnished under this section.

E Individual drawings and data sheets submitted at random intervals will not be accepted for review.

F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.

B The manuals shall, at minimum, include the following:

1. Table of contents
2. Manufacturer (including contact information)
3. Model number
4. Programming manual (where applicable)
5. Wiring diagrams
6. Trouble-shooting guidelines (where applicable)
7. Voltage ratings
8. Current ratings
9. Calibrated range (where applicable)
10. List of capabilities
11. Environmental ratings
12. NEMA enclosure type
13. Maintenance instructions and intervals
14. Calibration procedures and intervals
15. Installation instructions
16. Repair instructions (where applicable)
17. As-built drawings

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

1.7 DEFINITIONS

A. Intermediate distribution frame (IDF): An intermediate distribution of horizontal cabling to other cabling (e.g. horizontal, backbone, or equipment).
B. Main Distribution Frame (MDF): A main distribution for, 1st level backbone cables, entrance cables, and equipment cables. The Main Distribution-frame is often co-located in the building Entrance Facility (EF) and/or Equipment Room (ER) and consisting of riser cable terminals, utility service cables terminals, PBS terminals, and other equipment.

PART 2 – PRODUCTS

2.1 GENERAL

A. All IDF, MDF, et cetera shall be enclosed unless open racks are called out on the plans.
B. Top of wall mounted IDFs shall be 18” below ceiling.
C. Provide all necessary mounting hardware.
D. All material shall be UL listed for its application.

2.2 ENCLOSURES AND RACKS

A. Manufacturers
1. APC
2. Black Box
3. Chatsworth Products, Inc.
4. Cooper B-Line
5. Hoffman Enclosures
6. Hubbell Premise Wiring
7. Southwest Data Products
B. Main Distribution Frames
1. Four posts: Front and rear pairs of 3” deep C-shaped equipment mounting channels, 19” wide
2. Minimum of 42 rack units
3. 2000 pound static load capacity
4. Provisions for anchoring to floor
5. Zone 4 Seismic rated
6. Provide and install a minimum of 6 shelves with the following requirements
a. 4 points of attachment
b. 200 pound capacity
c. Vented
7. Mount a backboard on wall behind cabinet or rack
a. 48” wide by 96” high by 3/4” deep plywood
b. Mounting: 3/8”x2” long wood or self-tapping screw every 12” along wall stud
c. Paint with 3 coats of fire resistant paint.
8. Fiber optic cable storage ring: Black Box FOSR24

9. MDFs shall be floor mounted unless otherwise noted.

C. Intermediate Distribution Frames
   1. Four posts
   2. Minimum of 24 rack units
   3. 300 pound static load capacity
   4. Provisions for wall mounting
   5. Provide and install a minimum of 3 shelves with the following requirements
      a. 4 points of attachment
      b. 60 pound capacity
      c. Vented
   6. 18” DIN rail
   7. Mount a backboard inside rear of cabinet (enclosed IDF) or on wall behind rack (open IDF)
      a. 3/4” plywood
      b. Mounting: 3/8”x2” long wood or self-tapping screw every 12” along wall stud
      c. Paint with 3 coats of fire resistant paint.
   8. Fiber optic cable storage ring: Black Box FOSR12
   9. IDFs shall be wall mounted unless otherwise noted.

D. Cabinets
   1. General
      a. Material: Steel
      b. 18” DIN rail
      c. Wall mounted cabinets shall be composed of three sections:
         1) Rear panel mounted to wall
         2) Main section shall be hinged on rear panel and include lock to secure in closed position to rear panel.
         3) Front door shall be hinged on main section and lockable in the closed position.
      d. Hinges shall be reversible to allow swing open from the right or left.
      e. The front door shall have rounded edges and corners.
      f. Floor mounted cabinets shall have locking front and rear doors.
   2. Enclosed rack/cabinet in cooled room
      a. Top mounted ventilation fan(s)
         1) Minimum flow rate of 450 CFM for MDF cabinet
         2) Minimum flow rate of 225 CFM for IDF cabinet
      b. MDF cabinets shall include 250 CFM enclosure blower.
      c. Ventilation openings in sides or front
      d. MDF cabinets shall have locking, mesh front and rear doors.
      e. IDF cabinets shall have a locking front door with smoked poly-methyl-methacrylate window.
      f. Install temperature switch in cabinet to turn the fan on at 100°F and off at 90°F.
   3. Coating
      a. The completed rack or cabinet shall be degreased and cleaned.
      b. After the cleaning process is finished, the rack or cabinet shall be phosphatized.
      c. After the phosphatizing, the rack or cabinet shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.
         1) The minimum thickness of the paint film shall be 2.0 mils.

2) Paint film shall be uniform in color and free from blisters, sags, flaking and peeling

d. Finish shall conform to UL 50 and UL 50E.

e. Color shall be black for interior locations and ANSI 61 gray for exterior locations.

f. Coat underside surfaces of equipment outdoors or in damp locations with a corrosion resistant coating.

E. Each rack unit space shall be identified on the racks/posts.

F. The contractor shall calculate space requirements prior to ordering equipment. If the specified enclosure or rack is not large enough, the contractor shall order the size required for the equipment to be installed.

2.3 COPPER PATCH PANELS

A. 48 Port, Category 6a patch panel: Panduit #CPP48WBLY

B. Data ports

1. RJ45 design
2. Terminate 26AWG to 22 AWG, stranded or solid, Cat-6A cables without punch-down tool
3. Suppress alien cross-talk
4. Maintain 10GB/S performance in 48 port, 1RU patch panels
5. T568B wiring scheme
6. Meet or exceed Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
7. Compatible with IEEE 802.3at POE+
8. Snap in, snap out modular design
9. Conductor retention and strain relief
10. Gold plated contacts
11. Manufacturer and models
    a. Black: Panduit #CJ6X88TGBL
    b. Blue: Panduit #CJ6X88TGBU
    c. Green: Panduit #CJ6X88TGGR
    d. Purple: Panduit #CJ6X88TGVL
    e. Red: Panduit #CJ6X88TGRD
    f. White: Panduit #CJ6X88TGIW
    g. Yellow: Panduit #CJ6X88TGYL
12. Ports in patch panels shall be grouped by use (data, VOIP, clock/public address, etc.)

C. Patch cords

1. RJ45 design
2. Four twisted, unshielded, 23 AWG, solid pairs (23 AWG UTP)
3. Suppress alien cross-talk
4. Maintain 10GB/S performance
5. T568B wiring scheme
6. Meet or exceed Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
7. SRL, Attenuation and NEXT results shall use Sweep Frequency test per TIA-568-C.
8. Compatible with IEEE 802.3at POE+
9. Snagless latch on plugs
10. Length shall be 12 inches
11. Manufacturer and models
    a. Black: Panduit #UTP6A1BL

b. Blue: Panduit #UTP6A1BU
c. Green: Panduit #UTP6A1GR
d. Purple: Panduit #UTP6A1VL
e. Red: Panduit #UTP6A1RD
f. White: Panduit #UTP6A1IW
g. Yellow: Panduit #UTP6A1YL

D. Colors for RJ45 ports and patch cables shall be:
1. Clocks: Green
2. Data: Blue
3. Energy management system: Purple
4. Power distribution units: Black
5. Servers: White
6. Speakers: Green
7. Surveillance: Red
8. Uninterruptable power supplies: Black
9. Wireless access points: Yellow

E. Quantity: provide and install sufficient patch panels and patch cords to accommodate all devices with:
1. 48 spare ports for MDFs
2. 24 spare ports for IDFs

F. Port identification: Panduit #C061X030FJJ

2.4 FIBER OPTIC PATCH PANELS

A. Patch panel: Panduit #CFAPPBL1
B. Fiber adapter panels (FAP)
1. Multi-mode
a. OM4
b. 12 Duplex LC adapters per FAP
c. Zirconia ceramic, split sleeve ferrules
d. Color: Blue
e. Manufacturer: Panduit
2. Single-mode
a. OS2
b. 12 Duplex LC adapters per FAP
c. Zirconia ceramic, split sleeve ferrules
d. Color: Green
e. Manufacturer: Panduit

C. Install blank adapter panel in each unused space in the patch panel: Panduit #FAPB
D. Fiber optic patch cords
1. Cords shall have duplex LC connectors on one end and SFP connectors on other end.
2. Length shall be 8 inches for patch panel adjacent to switch. Add 1.75 inches to length for each rack unit separating patch panel from switch.
3. Multi-mode patch cords shall be OM4. Single-mode patch cords shall be OS2.
4. Cord and connector colors shall match adapter colors.

E. Quantity: provide and install sufficient devices to accommodate all backbone cable strands with:
1. 36 spare terminals for MDFs
2. 12 spare terminals for IDFs

F. Port identification: Panduit #C061X030FJJ

2.5 TELCO SPLICE BLOCKS

A. Where called out on plans provide and install a 50 pair, Type 66 Telco Splice Block; Black Box JP620 or equivalent.
B. Quantity: provide and install sufficient splice blocks to accommodate 150% of phone lines terminating at MDF.
C. All terminals shall be screw type.

2.6 POWER SUPPLIES

A. IDF Uninterruptable Power Supply
   1. UPS shall be APC rack mountable Smart-UPS or Symmetra series.
   2. Refer to plans for size of UPS. If size is not shown on plans, size of UPS shall be 900VA per 48 port LAN switch.
   3. Provide and install APC AP9631 Network Management Card with Environmental Monitoring and APC AP9335TH temperature and humidity sensor.
   4. Provide and install Cat-6A patch cord from UPS to LAN switch.
B. All UPS feeding data equipment shall have battery packs allowing for 30 minutes of runtime at full load during power outage.
C. Power Distribution Units
   1. PDUs shall be rack mounted, switched outlet type with sequenced start-up.
   2. PDU(s) shall have a minimum of 8 5-15R and/or 5-20R per 2kVA of UPS capacity. Coordinate receptacle types with equipment being fed by PDU(s).
   3. Quantity of PDUs shall allow usage of full capacity of UPS.
   4. PDUs shall be capable of cycling power to each receptacle via network.
   5. Coordinate input type(s) of PDU(s) with output type(s) of UPS.
   6. Provide and install Cat-6A patch cord from each PDU to LAN switch.
D. All UPSs and PDUs shall include the following features.
   1. Minimum of one RJ-45 Ethernet port
   2. SMNPv3, SSL, SSH
   3. Password protection
   4. User defined alarms with email alerting
   5. Load display
E. Provide and install APC InfraStruxure Manager software and license for each UPS and PDU.

2.7 GROUNDING AND BONDING

A Grounding Busbar
   1 Grounding Busbars shall be 4” high by 12” wide by 0.25” thick solid copper bar.
   2 The busbar shall be 4” high and 12” long and shall have 18 attachment points (two rows of 9 each) for two-hole grounding lugs.
   3 The hole pattern for attaching grounding lugs shall meet the requirements of TIA-607-B and shall accept 30 lugs with 5/8” hole centers and 6 lugs with 1” hole centers.
   4 The busbar shall include wall-mount stand-off brackets, assembly screws and insulators.
   5 The busbar shall be UL Listed as grounding and bonding equipment.

6 Grounding Busbar shall be Chatsworth Products, Inc. 40153-012, or approved equal.

B Vertical Rack Busbar
1 Vertical, rack-mounted busbar shall be constructed of 1/4” thick by 5/8” wide, hard-drawn copper bar.
2 Busbar shall be designed to mount into the channel of the rack without interfering with mounting of equipment on the rack.
3 Bar shall have eight 6-32 tapped ground mounting holes on 1” intervals and four 0.281” holes for the attachment of two-hole grounding lugs.
4 Busbars shall run entire height of rack.
5 Busbars shall be Chatsworth Products, Inc. 40161-036 and/or 40161-072

C Antioxidant Joint Compound
1 Aluminum to copper: Chatsworth Products, Inc. 40166-xxx
2 Copper to copper: Chatsworth Products, Inc. 40168-xxx

2.8 SURGE SUPPRESSION

A. Provide and install a 10 GB/S data-line surge suppressor for each data and VOIP cable entering a building: Phoenix Contact #DT-LAN-CAT.6+
B. Provide and install a telephone line surge suppressor for each analog telephone line entering a building: Black Box #SP365A-R2 or equivalent

PART 3 – EXECUTION

3.1 INSTALLATION

A Cabinets, racks, and enclosures
1 Mount all cabinets and racks to walls or floors according to the Typical Electrical Details.
2 Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.

B Cable trays
1 Cable trays must be securely attached to walls, backboards, and racks/cabinets to comply with all Zone 4 seismic requirements.
2 Cable trays shall be installed so that there is a minimum of 8” of unobstructed clearance above rack.
3 Cable trays shall be installed so that there is a minimum of 12” of clearance from all florescent lighting, electrical conduits/circuits, and fire alarm conduits/devices.
4 Cable trays shall be NEMA class designation 12B.

C Rack mounted equipment
1 Securely fasten all rack mounted equipment to each rack rail with a minimum of two screws per rail and according to manufacturers’ recommendations.
2 Patch panels shall be mounted to front pair of rack rails.
3 PDUs shall be mounted to rear pair of rack rails.
4 All other equipment shall be mounted to both pairs of rack rails.
5 Alternate patch panels and switches so that each port in the patch panel is adjacent to the corresponding port in the switch.

D Cable management
1 Install vertical cable management raceways on each post of freestanding racks.

2 Install fiber optic storage ring on backboard behind each IDF/MDF or in rear of IDF cabinet. Loop each fiber optic cable round ring 3 times. Install ID tag on loop of each cable.

E Grounding and Bonding

1 Each MDF and IDF shall be equipped with a grounding busbar.

2 Each grounding busbar shall be connected to the building electrical grounding facility per plans.

3 All metallic equipment, including but not limited to, each rack, metallic backboard, cable sheath, metallic strength member, splice case, cable tray shall be grounded to its respective grounding busbar using a minimum #6 AWG stranded copper bonding conductor with a green insulation and compression connectors.

4 Wall mounted grounding busbars

a Attach busbars to the wall with appropriate hardware according to the manufacturer's installation instructions and Typical Electrical Details.

b Conductor connections to the grounding busbar shall be made with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.

c Each lug shall be attached with stainless steel hardware after preparing the bond according to manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.

d The wall-mounted busbar shall be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.

5 Rack-Mount Busbars and Ground Bars

a Each rack and cabinet shall be equipped with a vertical grounding busbar.

b Attach rack-mount busbars and ground bars to racks according to the manufacturer's installation instructions.

c Bond the rack-mount grounding busbar to the rack, cabinet, and room's grounding busbar with appropriately sized hardware and conductor.

6 Equipment Ground Jumper Kit

a Bond equipment to a vertical rack-mount grounding busbar using ground jumper according to the manufacturer's recommendations.

b Clean the surface and use antioxidant between the compression lugs on the jumper and the rack-mount grounding busbar to help prevent corrosion at the bond.

F Program UPSs, PDUs, and software to set alarms for current overload, temperature out of limits, and humidity out of limits and send email notification of alarm conditions.

3.2 LABELING

A. The contractor shall follow the Owner's labeling scheme.

B. Each IDF and MDF shall be labeled.

C. Each IDF, MDF, patch panel, port, switch, and cable shall have a unique identification.

D. Label each port on the patch panel and faceplate with its identification.

E. Label each cable at its beginning and end points no further than 6" behind termination on a section of cable that is easily accessible. Cable labels shall include the ids of both terminations and cable id.

F. Label the plug end of each power cord with id of equipment it feeds.

G. Each faceplate shall be machine labeled. The labeling shall be placed on the faceplate so that the individual jack can be clearly identified by its associated label.

H. All labels shall be machine printed. Handwritten labels are not acceptable.

I. All labeling information shall be recorded on the as-built drawings and all test documents.

3.3 SYSTEM CLOSEOUT AND AS-BUILT DOCUMENTATION

A Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Owner's Representative/Engineer for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.

B Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 calendar days of the completion of each testing phase. At the request of the Owner's Representative/Engineer, the telecommunications contractor shall provide copies of the original test results.

C The Owner's Representative/Engineer will request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

D Test Results documentation shall be provided in two media, as listed above, one (1) hardcopy and one (1) on disk within three weeks after the completion of the project. The documentation shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, a bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

E Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.

F When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

G The As-Built drawings are to include cable routes, outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD 2008) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.

H Contractor will provide one laminated 11"x17" drawing at each IDF and MDF that includes the building layout for that IDF or MDF, along with the outlet locations and all of the approved labeling.

END OF SECTION

SECTION 27 15 00 COMMUNICATIONS HORIZONTAL CABLING

PART 1 – GENERAL

1.1 SECTION INCLUDES

This section includes material and workmanship requirements for data, telephone (analog and VOIP), IP clocks, and IP speakers horizontal cabling.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A Division 1
- 1 Section 013000: Administrative Requirements
- 2 Section 013300: Submittal Procedures
- 3 Section 014000: Quality Requirements
- 4 Section 016000: Product Requirements
- 5 Section 017000: Execution and Closeout Requirements
- 6 All other included sections under Division 1

B All included sections under Division 26

C All included sections under Division 27

D Plans

E Manufacturers' manuals, product bulletins, etc.

1.3 REFERENCE STANDARDS AND CODES

A. Governing Codes and Conflicts: If the requirements of the Construction Documents exceed those of the governing codes and regulations, then the requirements of the Construction Documents shall prevail. Where a conflict exists, the governing codes and ordinances shall supersede all other requirements.

B. ANSI: American National Standards Institute (ANSI)

C. CEC: California Electrical Code

D. Institute of Electrical and Electronic Engineers (IEEE)
1. IEEE 802.3: IEEE Standard for Ethernet
2. IEEE 802.3ad: Link Aggregation
3. IEEE 802.3af: Power over Ethernet
4. IEEE 802.3at: Enhanced Power over Ethernet

E. Insulated Cable Engineers Association (ICEA)
1. ICEA S-84-608: Telecommunications Cables, Filled Polyolefin Insulated, Copper Conductor
2. ICEA S-102-700: ICEA Standard for Category 6 Individually Unshielded, Twisted Pair Indoor Cables (With or Without an Overall Shield) for Use in Communications Wiring Systems Technical Requirements

F. Telecommunications Industries Association (TIA)
1. TIA-568-C: Commercial Building Telecommunications Standard
2. TIA-568-C.0: Generic Telecommunications Cabling for Customer Premises
3. TIA-568-C.1: Commercial Building Telecommunications Cabling Standard
4. TIA-568-C.2: Balanced Twisted-Pair Telecommunications Cabling and Components Standards
5. TIA-569-C: Commercial Building Standard for Telecommunications Pathways and Spaces

6. TIA-606-B: Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
7. TIA-607-B: Commercial Building Grounding and Bonding Requirements for Telecommunications
8. TIA-758-B: Customer Owned Outside Plant Telecommunications Infrastructure Standard
9. TIA-1152: Requirements for Field Test Instruments and Measurements for Balanced Twisted Pair Cabling
10. TIA-1183: Measurement Methods and Test Fixtures for Balun-less Measurement of Balanced Components and Systems
11. TIA-TSB-36: Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted-Pair Cables
12. TIA-TSB-67: TIA Telecommunications Systems Bulletin, Additional Transmission Specifications for Unshielded Twisted-Pair Connecting Hardware
13. TIA-TSB-184: Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling
14. TIA-TSB-1197: Mode Conversion Parameters for Balanced Twisted Pair Cabling

G. Underwriters Laboratories, Inc.
1. UL 444: Communications Cables
2. UL 1666: Standard for Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
3. UL 1690: Standard for Data-Processing Cable
4. UL 1863: Communications Circuit Accessories
5. UL 1977: Component Connectors for Use in Data, Signal, Control, and Power Applications
6. UL 2024: Standard for Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies
7. UL 2269: Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes
8. UL 62368-1: Audio/video, information and communication technology equipment - Part 1: Safety requirements

1.4 QUALITY ASSURANCE

A Contractor requirements:
1 The Contractor shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.
2 Project Manager
a The Project Manager shall have successfully completed a minimum of 5 telecommunications projects of the same size and scope.
b The contractor shall make the project manager available to the Owner/Owner's Representative before the start of this project for an interview. This person must be deemed acceptable by the Owner and/or their Representative before work can begin.
c Project Manager will be required to be available for scheduled on site project meetings at no additional cost to the Owner.
d Project Manager will be required to be available to meet on site with the Owner/Owner's representative with a minimum of 24 hours notice for non- emergency issues, and a minimum of 4 hours for emergency issues at no additional cost to the Owner.
3 The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context 'good quality' means the

work shall meet industry technical standards and quality of appearance. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

4 The Contractor shall provide all necessary materials and labor for a complete, functional Telecommunications cabling infrastructure in accordance with all applicable standards and the Construction Documents.

B Material requirements

1 All material and equipment to be installed on this project will be new and free from defects.

2 Equipment and accessories shall be the product of a manufacturer regularly engaged in its manufacture.

3 New material shall meet the following requirements.

a Manufactured within one year of the installation date.

b Undamaged

c Not previously installed

d Delivered to jobsite in original packaging

e No corrosion or other degradation of material

f In factory condition

g Unmodified

4 If used material or equipment has been installed on this project the Contractor shall replace said materials and/or equipment with new products at no additional cost to the Owner.

5 Equipment and accessories shall be in compliance with the applicable standards listed in Article 1.3 of this section and with applicable national, state and local codes.

6 Items of a given type shall be the products of the same manufacturer.

7 Deliver, store and protect products under provisions of Section 016200.

8 Ship equipment in its original packages, to prevent damaging or entrance of foreign matter. Perform handling and shipping in accordance with manufacturer's recommendations. Provide protective covering during construction.

9 Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by the engineer.

10 Tag items with a weatherproof tag identifying equipment by name and purchase order number. Include packing and shipping lists.

C Contractor shall warranty all materials, equipment, and workmanship for a minimum of one (1) year.

1 Warranty shall provide repair/replacement of all defective or improperly installed materials at no additional cost to the Owner (including all costs to repair or replace the item(s)).

2 Contractor shall provide a competent service technician and new materials to repair/replace defective items no later than 24 hours after notification.

1.5 SUBMITTALS

A Submit under provisions of Section 013000 or 013300.

B Submittals shall include the following:

1 Table of contents

2 A complete set of detailed manufacturer’s specifications describing and illustrating all standard and special components and materials

3 Part numbers

4 Evidence of compliance with the applicable standards listed under Article 1.3 of this section
5 Maintenance instructions and intervals
6 A complete set of drawings for any special items
7 A single line block diagram showing exactly the manner in which the contractor proposes to layout the system.
8 Wiring diagrams
9 Drawings shall include designations, dimensions, operating controls, instruments, riser diagrams, routing diagrams etc.

C Electronic submittals shall be searchable

D The submittal shall be substantially complete for all items and equipment furnished under this section.

E Individual drawings and data sheets submitted at random intervals will not be accepted for review.

F Substitutions: Items of same function and performance shall be submitted in conformance with Division 1.

1.6 OPERATION AND MAINTENANCE MANUALS

A Submit operation and maintenance manuals in accordance with Section 260000.

B The manuals shall, at minimum, include the following:
1 Manufacturer (including contact information)
2 Model number
3 Programming manual (where applicable)
4 Wiring diagrams
5 Trouble-shooting guidelines (where applicable)
6 Voltage ratings
7 Current ratings
8 Calibrated range (where applicable)
9 List of capabilities
10 Environmental ratings
11 NEMA enclosure type
12 Maintenance requirements
13 Installation instructions
14 Repair instructions (where applicable)

C Provide manuals in one of the following formats
1 Three hardcopies
2 PDF

PART 2 – PRODUCTS

2.1 GENERAL

A. All material shall be UL listed for its application.

B. Cables shall be rated for its intended use, i.e. plenum, riser, wet location, etc.

C. Cables, conductors, and all other components shall meet the requirements of standards listed in Section 1.3.

2.2 DATA AND VOIP HORIZONTAL CABLING

A. Contractor shall provide, install, and test a Cat-6 cable link from each Data/VOIP Outlet directly to the IDF utilizing the hardware listed below (or approved equivalent) in full compliance with all applicable standards, local and national codes, manufacturers' recommendations, and otherwise noted within these specifications.

B. Specifications:
   1. Four twisted, unshielded, 23 AWG, solid copper pairs (23 AWG UTP)
   2. Suppress cross-talk
   3. Maintain 10GB/S performance
   4. Meet or exceed Cat-6 requirements of TIA-568-C.2 and IEEE 802.3an.
   5. SRL, Attenuation and NEXT results shall use Sweep Frequency test per TIA-568-C.
   6. Have UL verification to Cat-6 specifications.
   7. Compatible with IEEE 802.3at POE+
   8. Color for cables shall be blue.
   9. Berk-Tek LANmark-2000 or approved equal

C. Cables shall be rated for its intended use, i.e. plenum, riser, wet location, etc.

D. Cables, conductors, and all other components shall meet the requirements of standards listed in Section 1.3.

E. Provide all termination accessories, dressing accessories, enclosures, and testing for a complete fiber optic distribution system. Refer to Specification Section 271100.

F. Identification
   1. Interior: Panduit S100X225YAJ self-laminating, polyester label
   2. Exterior: Panduit MT350W17-Q stainless steel tag with rounded edges & corners

G. Contractor shall determine cable "link" quantities as shown on the Construction Documents.

2.4 OUTLET HARDWARE

A Data and VOIP Ports:
   1 Category 6, RJ45 port: Panduit CJ688TGBUY
   2 Terminate 26AWG to 22 AWG, stranded or solid, Cat-6 cables without punch-down tool
   3 Suppress cross-talk
   4 Maintain 1GB/S performance in 48 port, 1RU patch panels
   5 T568B wiring scheme
   6 Meet or exceed Cat-6 requirements of TIA-568-C.2.
   7 Compatible with IEEE 802.3at POE+
   8 Snap in, snap out modular design
   9 Conductor retention and strain relief
   10 Gold plated contacts

B Wallplates:
   1 Commercial , educational, industrial, and institutional
      a Material: Satin finish stainless steel
      b For data or telephone – one module space: Black Box WP370 or equivalent
      c For data and telephone – two module spaces: Black Box WP371, Panduit CFPL2SY, or equivalent
      d For data and telephone – two module spaces: Black Box WP373, Panduit CFPL4SY, or equivalent
   2 Residential:
      a Material: Nylon

b Color: Wallplate color shall closely match wall color.
c For data or telephone – one module space: Panduit NK1FNWH or equivalent
d For data and telephone – two module spaces: Panduit NK2FNWH or equivalent
e Wallplate Specifications: The wallplate housing shall be a one-piece, single-gang flush mount style that fits standard NEMA openings, on four-square boxes with reducer. It should provide 1-port field-configurable with a variety of simplex snap-in ports/connectors. It must be made of high-impact, self-extinguishing plastic rated UL 94V-0, and be UL Listed, CSA certified, and compliant with FCC Part 68 and TIA-568-C specifications. Wallplate screws must match wallplate color.

3 Provide an install a blank module for each unused opening in the wallplates, Panduit CMBIG-X or equivalent.

4 Labels: Panduit C125X030YPT self-adhesive, polyester label

C Back box: 4 inch square box with one gang plaster

2.5 MISCELLANEOUS MATERIALS

A Conduits: Refer to Section 260500.

B Supports: Refer to Section 260529.

C J-Hooks shall be steel with closure and two bolt holes. Finished part shall be hot dipped galvanized.

2.6 IDENTIFICATION

A Interior: Panduit #S100X225YAJ self-laminating, polyester label

B Exterior: Panduit #MT350W17-Q stainless steel tag with rounded edges & corners

PART 3 – EXECUTION

3.1 INSTALLATION

A Cables

1 Cable shall be installed in accordance with manufacturer’s recommendations and best industry practices.

2 Contractor shall use Velcro strip to bundle cables together. Tie Wraps will not be allowed for supporting, bundling, and/or dressing of any cables.

3 Contractor shall provide a three foot service loop for all cables. The service loop will be coiled and secured using Velcro in the accessible ceiling at the conduit stub to the work area outlet box.

4 A 1/8” diameter, nylon pull cord shall be co-installed with all cable installed in any conduit.

5 Cable raceways shall not be filled greater than the TIA-569-C maximum fill for the particular raceway type or 40%.

6 Cables shall be installed in continuous lengths from origin to destination. Splices are not permitted.

7 Do not exceed the manufacturer’s minimum bend radius and maximum pulling tension for cables.

8 Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.

9 Cables shall be dressed and terminated in accordance with the recommendations made in the TIA-568-C standards, manufacturer's recommendations, and best industry practices.

10 The cable jacket shall be maintained to within 1/2 inch of the termination point.

11 Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable every 3 feet.

12 Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

13 All cables shall be neatly bundled and dressed continuously from the entrance point of the data room or cabinet to their respective panels. Each panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame. Cables in all other rooms shall be concealed.

14 Inside Buildings: Cable and conductors shall be routed in conduit, or surface mounted raceway, run overhead and parallel to the structure.

- a Conduit shall be rigid steel, IMC, or EMT as described elsewhere in these specifications.
- b Plastic conduit shall not be used above grade.
- c Cable may be used behind accessible T-bar ceilings without conduit. Mount cable at the roof joist (or bottom of floor above) on 1" wide 'J-hooks' or 'bridle-rings' at every 5'-0" or less. Support each cable within 1'-0" of its termination point. Run cable parallel and perpendicular to the building structure and provide mechanical support for vertical runs by using Unistrut channel securely fastened in place.
- d Cable and conductors shall not be attached to the support wire of the T-bar ceiling or laid across the ceiling boards.

15 Between buildings: Cable and conductors shall be routed in conduit run underground.

- a Conduit shall be rigid steel, IMC, or plastic as described elsewhere in these specifications.
- b The use of EMT is not acceptable.

16 On The Roof: Conduit shown on the drawings as being on the roof of the building or covered walkway shall be installed on 4" by 4" pressure treated wood blocking (sleepers) attached to the structure every 8'-0" or less.

- a Conduit shall be rigid steel or IMC as described elsewhere in these specifications.
- b The use of EMT or plastic conduit is not acceptable.

17 Make all underground runs continuous without splices or taps. Use underground boxes for *pulling purposes only*.

18 Only use pulling grip approved by the cable manufacturer.

19 Clean conduit with mandrel prior to pulling.

20 Make all connections and splices in a clean environment.

21 Follow cable manufacturer's and device manufacturer's instructions for connections to devices.

22 Maximum combined cable length (patch cords and installed cable) from switch to end user equipment shall be 328 feet.

23 Stranded conductors shall be "tinned" with solder before terminations are made.

24 Make all terminations in cabinets and at terminal backboards on terminal blocks and/or Patch Panels as specified above.

B Outlets Installation

1 No more than 12” of cable shall be stored in an outlet box, modular furniture raceway, or insulated walls.

2 Data jacks, unless otherwise noted in drawings, shall be located in the top position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the left-most position(s).

3 Voice jacks, unless otherwise noted in drawings, shall occupy the next position(s) below the data on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the position right of the data jack.

4 All faceplates installed shall be level.

3.2 LABELING

A. The contractor shall follow the Owner’s labeling scheme.

B. Label each cable at its beginning and end points no further than 6” behind termination on a section of cable that is easily accessible. Cable labels shall include the ids of both terminations and cable id.

C. All labels shall be machine printed or embossed. Handwritten labels are not acceptable.

D. All labeling information shall be recorded on the as-built drawings and all test documents.

E. Label all cable beginning and terminating points.

F. Labels for site cables and cables in multiple buildings shall feature the following.

1. Identify origin (MDF or IDF and building), termination (IDF or port identifier), and next pull box.

2. Cables in pull boxes shall have a label at entry into pull box and exit from pull box. Labels shall be stainless steel tags with embossed characters.

3.3 TESTING

A. General

1. All cables (including each fiber) and termination hardware shall be tested.

2. Testing must comply with TIA standards for testing (refer to Section 1.3), plans, specifications, and manufacturer recommendations.

3. Contractor shall notify the Owner or Owner’s Representative 72 hours before commencement of testing.

4. Upon receipt of the test documentation, the Customer reserves the right to have the contractor perform a 20% witnessed “spot testing” of the cabling system to validate test results provided in the test document, at no additional cost. If a significant amount of cables are marginal and/or fail during the “spot test” Contractor will retest the entire cable plant at no additional cost.

B. Equipment

1. All equipment must be properly calibrated and traceable to NIST.

2. Equipment shall have been recalibrated within the previous 6 month prior to testing.

C. Data Copper Cables:

1. Each pair in each cable shall be tested in accordance with TIA-568-C series and TIA-TSB-67 for:

a. Opens

b. Shorts

c. Grounds

d. Continuity

e. Polarity
f. DC resistance
g. DC resistance unbalance
h. Impulse noise
i. Signal attenuation
j. NEXT
k. PS-NEXT
l. ELFEXT
m. PS-ELFEXT
n. Return loss
o. Propagation delay
p. Delay skew

2. Each installed cable link shall be tested for installed length using a TDR type device. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.
3. Conductors and connectors shall be tested as a complete system.
4. Testing of all horizontal cable, outlet ports, patch cords, and riser cable pairs shall include end-to-end tests using a Wavetech Lanteck 100 or Fluke Network's DXT CableAnalyzer Series scanner.
5. Test cables to check that they meet all IEEE and TIA Cat-6 and 1GB/S performance specifications (refer to Section 1.3).
6. All installed cables must meet or exceed the defined standards for performance. The Contractor shall take all steps necessary to repair or replace any optic not meeting the standard.
7. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA standards.
8. The test equipment shall provide a printed document for each test that is also available in a downloadable file using an application from the test equipment manufacturer. The printed test results shall include a print out of all tests performed, and the individual test results for each cable.

3.4 SYSTEM CLOSEOUT AND AS-BUILT DOCUMENTATION

A Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Owner's Representative/Engineer for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.

B Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 calendar days of the completion of each testing phase. At the request of the Owner's Representative/Engineer, the telecommunications contractor shall provide copies of the original test results.

C The Owner's Representative/Engineer will request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

D Test Results documentation shall be provided in two media, as listed above, one (1) hardcopy and one (1) on disk within three weeks after the completion of the project. The

documentation shall be clearly marked on the outside front cover with the words “Project Test Documentation”, the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, a bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

E Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.

F When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

G The As-Built drawings are to include cable routes, outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD 2008) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.

H Contractor will provide one laminated 11”x17” drawing at each IDF and MDF that includes the building layout for that IDF or MDF, along with the outlet locations and all of the approved labeling.

END OF SECTION

General Info

Total:

$6,763,000.00

Number

24-S-14

Deadline

04/03/2025 02:00 PM PDT

Vendor

Better Enterprises, Inc.

Submitted

04/03/2025 01:39 PM PDT

Signed by

Marc Kerkochian
Account Holder Susan Waid

Opened

04/03/2025 02:02 PM PDT **By** jwongsing@fresnocountyca.gov

Description

Department of Public Health Basement Renovation

The work to be done consists of, in general, the redesign and interior improvements of the basement of the Brix-Mercer Building that was previously damaged by flooding. Interior improvements to consist of the assembly of meeting rooms, offices, and storage occupancies including the construction of new walls, carpeting, and painting, with upgrades to the plumbing, mechanical, fire sprinklers, and electrical systems.

Allows zero unit prices and labor

No

Allows negative unit prices and labor

No

Attachment List

County of Fresno - Project Website
RFC form, bid opening details, any Supplemental Information including RFC responses, Pre-bid Conference information, etc.

Project Manual
Specifications

Plans - County approved (54 MB)
Drawings approved by Fresno County

Plans - Fire Department approved Part 1 (212 MB)
Drawings with notations and approved by Fire Department

Plans - Fire Department approved Part 2 (229 MB)
Drawings with notations and approved by Fire Department

Plans - Fire Department approved Part 3 (207 MB)
Drawings with notations and approved by Fire Department

Instructions to Bidders
Instructions for Completing the Bid Book within the Specifications

Addendum 1 (http://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/design/construction-bidding-opportunities/24-s-14-dph-basement-renovation/00-91-15-addendum-1.pdf)
Addendum 1

Addendum 2 (http://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/design/construction-bidding-opportunities/24-s-14-dph-basement-renovation/00-91-15-addendum-2.pdf)
Addendum 2

Plan Sheet P2.03 - Addendum 2 (http://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/design/construction-bidding-opportunities/24-s-14-dph-basement-renovation/plan-sheet-p2.03-addendum-2.pdf)
Plan Sheet P2.03 - Addendum 2

PROPOSAL TO THE COUNTY OF FRESNO

Contract Name: **DEPARTMENT OF PUBLIC HEALTH BASEMENT RENOVATION**

Contract No.: **24-S-14**

Fund / Subclass / Org / Account / Program or Memo No.: **5620 / 1500 / 08150 / 91760**

The work to be done consists of, in general, the redesign and interior improvements of the basement of the Brix-Mercer Buildings that was previously damaged by flooding. Interior improvements to consist of assembly of meeting rooms, office, and storage occupancies including the construction of new walls, carpeting, and painting, with upgrades to the plumbing, mechanical, fire sprinklers, and electrical systems.

The work to be done is shown on a set of Plans, entitled: “Fresno County Dept. of Public Health Basement Renovation”

Building No.: 611 and 612

Project Address:

1221 Fulton Street

Fresno, CA 93721

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, each issued by a surety satisfactory to the Awarding Authority, within ten (10) days after the award of the contract, the Awarding Authority, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the County.

The undersigned, as bidder, declares that all addenda issued with respect to this bid have been received and incorporated into this Proposal. The bidder’s signature on this Proposal also constitutes acknowledgement of all addenda.

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm or corporation; that the bidder has carefully examined the annexed proposed form of contract, and the plans therein referred to; and the bidder proposes and agrees if this proposal is accepted, that the bidder will contract with the County of Fresno to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the County as therein set forth, and that the bidder will take in full payment therefor the following lump sum price, to-wit:

Proposal Section 004213 - 2 Bid

$6,763,000.00

Item No.	Item Description	Item Price	Extension
1	Base Bid	$6,763,000.00	$6,763,000.00
			Total: $6,763,000.00

Proposal Section 004213 - 3 Acknowledgement of Addendum

Type N/A if no addenda were issued. Click "+" to add additional fields.

Addendum No. *

01

Dated *

03/24/2025

Type N/A if no addenda were issued. Click "+" to add additional fields. 1

Addendum No. *

02

Dated *

03/28/2025

Bid Security Form Section 004313 - 1

Accompanying this proposal is security (check one only) in an amount equal to at least ten percent (10%) of the total amount of the bid:

Bond Percentage

10.00%

Guarantee Method *

Paper Bid Bond, Certified Check, Cashier's Check, Cash, Scan of Paper Bid Bond

Paper Bid Bond, Certified Check, Cashier's Check, Cash, Scan of Paper Bid Bond

Confirmation *

I have provided a Paper Bid Bond for 10.00% of the bid total amount, to the public works office, prior to the solicitation deadline.

If Cash Security, Enter Amount

You must either attach an electronic bid bond here or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), **prior to** the bid opening.

Bid Security Form Section 0014313 - 2

The names of all persons interested in the foregoing proposal as principals are as follows:

Business Name *

Better Enterprises, Inc.

Note: If bidder or other interested person is a corporation, state legal *name of corporation. If bidder is a co-partnership, state* true *name of firm.*

Type of Business *

Corporation

Business Owners and Officers Names *

Marc Kerkochian, President

Note: If bidder or other interested person is:

- *a corporation, list names of the president, secretary, treasurer and manager thereof.*
- *a partnership, list names of all individual co-partners composing firm.*
- *an individual, state first and last name in full.*

Name of Owners and Key Employees *

Marc Kerkochian, President & Owner
Susan Waid, Secretary
Ben Emerzian, Treasurer

Note: List majority owners of your firm. If multiple owners, list all. Also include anyone, including key employees, who are actively promoting the contract. (SB1439)

Licensed in accordance with an act providing for the registration of Contractors:

Class *

B, C33, C-8

Contractor License *	**Expires ***
1012660	04/30/2026

DIR Registration Number *

1000565193

Business Address *

1148 N Cypress Ave, Fresno, CA 93727-6871

Zip Code *

93727

Mailing Address *

1148 N. Cypress Avenue, Fresno, CA

Zip Code *

93727

Business Phone * **Fax Number**

(559) 233-2225 x1007 (559) 233-2850

Email Address *

marc@betterenterprisesinc.com

Signature of Bidder *

Better Enterprises, Inc., a California Corporation by Marc Kerkochian, President

Dated *

04/03/2025

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, bidder signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

Subcontractors List Section 004336 - 1

SUBCONTRACTORS

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the total bid presented herewith. Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board. Submission of subcontractor's name, location of business and description of work, California contractor's license number and public works contractor registration number issued pursuant to Section 1725.5 of the Labor Code, all are REQUIRED, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields.

Subcontractor: *

Better Flooring, Inc.

Business Address *

1148 N. Cypress Avenue, Fresno, CA 93727

Class

C15, C54

License No. *

820202

DIR Registration No. *

1000000130

Item No. or Description of Work *

Flooring, Ceramic Tile

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

marc@betterflooringinc.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 1

Subcontractor: *

Best Fire Protection

Business Address *

1201 24th Street, Suite B110-334, Bakersfield, CA 93301

Class

C-16

License No. *

1054075

DIR Registration No. *

1000580773

Item No. or Description of Work *

Fire Sprinklers

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

chris@bestfire.us

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 2

Subcontractor: *

Western Building Materials Co.

Business Address *

4620 E. Olive Avenue, Fresno, CA 93702

Class

C-2

License No. *

248608

DIR Registration No. *

1000003005

Item No. or Description of Work *

Suspended Acoustical Ceilings; Fiberglass Reinforced Panels; Acoustic Wall Panels

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

brian@wbmco.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 3

Subcontractor: *

KC&S Construction Specialties, Inc.

Business Address *

432 Bitritto Way, Unit 3, Modesto, CA 95356

Class

C-61/D28, C-61/D34, C23

License No. *

1048604

DIR Registration No. *

1000063244

Item No. or Description of Work *

WD Doors, HM Frames and Finish Hardware

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

a.landingham@kcsconstructionspecialties.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 4

Subcontractor: *

Fresno Roofing Co., Inc.

Business Address *

5950 E. Olive Avenue, Fresno, CA 93727

Class

C39

License No. *

302777

DIR Registration No. *

1000004536

Item No. or Description of Work *

Roofing

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

ed@fresnoroofingco.net

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 5

Subcontractor: *

Shelco Industries

Business Address *

5425 E. Home Avenue, Suite 101, Fresno, CA 93727

Class

C-61/D34

License No. *

423565

DIR Registration No. *

1000007336

Item No. or Description of Work *

Toilet Partitions; Toilet Accessories; Lockers

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

bobs@shelcoindustries.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 6

Subcontractor: *

Cencal Services, Inc.

Business Address *

3299 S. Cedar Avenue, Fresno, CA 93725

Class

C21, C22, C-8

License No. *

976935

DIR Registration No. *

1000002906

Item No. or Description of Work *

Demolition; Saw Cutting

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

Jamesd@cencaldemo.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 7

Subcontractor: *

Alcal Specialty Contracting, Inc.

Business Address *

2647 N. Weber Avenue, Fresno, CA 93705

Class

C39, C-2, C-35

License No. *

815286

DIR Registration No. *

1000000315

Item No. or Description of Work *

Batt Insulation; Operable Partitions

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

mike.donahoo@alcal.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 8

Subcontractor: *

Valley Air Conditioning & Repair, Inc.

Business Address *

825 S. Topeka Avenue, Fresno, CA 93721

Class

C36, C-4

License No. *

669606

DIR Registration No. *

1000009688

Item No. or Description of Work *

Plumbing

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

sjohnson@valleyairrepair.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 9

Subcontractor: *

San Joaquin Glass

Business Address *

2150 E. McKinley Avenue, Fresno, CA 93703

Class

C-17

License No. *

248167

DIR Registration No. *

1000010471

Item No. or Description of Work *

Storefronts; Glazing

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

anthony@sjglass.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 10

Subcontractor: *

Frontline Plastering, Inc.

Business Address *

2549 N. Bundy Drive, Fresno, CA 93727

Class

C35, C-9

License No. *

1017354

DIR Registration No. *

1000055393

Item No. or Description of Work *

Cold Formed Metal Framing; Gypsum Board; Firestoping; Joint Sealants

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

doug@frontlineplasteringinc.com

Subcontractors List Section 004336 - 2

Optional: Vendor is not required to complete.

SUBCONTRACTORS

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields.

Subcontractor: *

Tarlton & Son, Inc.

Business Address *

3562 S. Elm Avenue, Fresno, CA 93706

Class

C33

License No. *

342341

DIR Registration No. *

1000004368

Item No. or Description of Work *

Painting

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

randyt@tarltonandson.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 1

Subcontractor: *

EI Executive Interiors

Business Address *

1020 S 10th St Fresno Ca 93702

Class

C-6

License No. *

885715

DIR Registration No. *

1000013318

Item No. or Description of Work *

Cabinets/Countertops

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

pfachenda@executiveinteriorsinc.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 2

Subcontractor: *

Strategic Mechanical, Inc.

Business Address *

4661 E. Commerce Avenue, Fresno, CA 93725

Class

C20, C38, C43

License No. *

834679

DIR Registration No. *

1000001726

Item No. or Description of Work *

Mechanical

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

AFornes@strategicmech.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 3

Subcontractor: *

The Boelter Companies, Inc.

Business Address *

9960 Business Park Drive, #120, Sacramento, CA 95827

Class

B

License No. *

1109217

DIR Registration No. *

1001103677

Item No. or Description of Work *

Food Service Equipment

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

kedens@boelter.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 4

Subcontractor: *

Meyers Constructors, Inc.

Business Address *

40488 Brickyard Dr., Madera, CA 93636

Class

B, C51

License No. *

1004811

DIR Registration No. *

1000034927

Item No. or Description of Work *

Rough Carpentry; Structural Steel

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

bryan@meyersconstructors.com

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 5

Subcontractor: *

A-C Electric Company

Business Address *

P O BOX 81977, Bakersfield, CA 93380

Class

C10

License No. *

99849

DIR Registration No. *

1000000365

Item No. or Description of Work *

Electrical

Dollar Amount: **OR** **Percentage of Total Bid:**

Email Address:

jeff.waughtal@a-celectric.com

Non-Collusion Declaration Section 004519 - 1

CONTRACT: DEPTARTMENT OF PUBLIC HEALTH BASEMENT RENOVATION
CONTRACT NO.: 24-S-14

To the Board of Supervisors, County of Fresno:

NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID *

The undersigned declares:

I am the (Choose one of the following options): *

Corporate Officer

If Corporate Officer please list Title:

President

of (Business Name): *

Better Enterprises, Inc.

the party making the foregoing 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 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 refrain from 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, and has not paid, and will not pay, any person or entity for that 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

Date: *

04/03/2025

at City, State: *

Fresno, California

Signature: *

Marc Kerkochian, President

(See Title 23 United States Code Section 112; Calif Public Contract Code Section 7106)

*NOTE: Completing, signing, and returning the Non-Collusion Declaration is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Equal Opportunity Clause - Section 004536 - 1

CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS

The bidder or proposed subcontractor hereby certifies that they

Please choose an option below *

have not participated

in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925 or 11114, and that they

Please select an option below *

have not filed

with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

Company *

Better Enterprises, Inc.

By: *

Marc Kerkochian

Title *

President

Date *

04/03/2025

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of $10,000 or under are exempt.) Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Director, Office of Federal Contract Compliance, U. S. Department of Labor.

Debarment and Suspension Certification - Section 004546 - 1

TITLE 49, CODE OF FEDERAL REGULATIONS, PART 29

DEBARMENT AND SUSPENSION CERTIFICATION

The bidder or proposed subcontractor under penalty of perjury, certifies that, except as noted below, he/she or any person associated therewith in the capacity of owner, partner, director, officer, manager:

is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;

has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;

does not have a proposed debarment pending; and

has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If no exceptions enter "No Exceptions." If there are any exceptions to this certification, insert the exceptions in the following space: *

No Exceptions

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility.

For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action:

Note: Providing false information may result in criminal prosecution or administrative sanctions.

The above certification is part of the Proposal. Signing the Proposal on the signature portion thereof shall also constitute signature

of this Certification.

By my signature on this proposal, I certify, under penalty of perjury under the laws of the State of California and the United States of America, that the Title 23 United States Code, Section 112 Non-Collusion Declaration and the Title 49 Code of Federal Regulations, Part 29 Debarment and Suspension Certification are true and correct.

Company *

Better Enterprises, Inc.

By *

Marc Kerkochian

Date *

04/03/2025

Title *

President

Nonlobbying Certification For Federal-Aid Contracts - Section 004556

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with awarding of any cooperative agreement, and the extension, continuation, renewal, amendment, or INSTALLATION of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, **the undersigned shall complete and submit Standard Form-LLL, “Disclosure of Lobbying Activities,” in accordance with its instructions.**

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

Bidder *

Better Enterprises, Inc.

By *

Marc Kerkochian

Date *

04/03/2025

Title *

President

Disclosure of Lobbying Activities - Section 004566

Disclosure of Lobbying Activities - Section 004566 (223 KB)
Disclosure of Lobbying Activities

Title 13 CARB Certification Section 004656 - 1

In conformance with Title 13 § 2449(i), bidders will be required to attach copies of valid Certificates of Reported Compliance for the fleet selected for the contract and their listed subcontractors.

Before May 15th of each year, the prime contractor must collect a new valid Certificate of Reported Compliance for the current compliance year, as defined in section 2449(n), from all fleets that have an ongoing contract with the prime contractor as of March 1 of that year. Prime contractors must not write contracts to evade this requirement. Annual renewals must be provided to the Resident Engineer at least one week prior to the expiration date of the current certificate.

https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements

Choose all that apply:

☐ **Bidder's Certificate of Reported Compliance has been attached to the bid.**

☑ **Bidder does not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4).**

☑ **Listed subcontractors' Certificate of Reported Compliance have been attached.**

☐ **The following subcontractors do not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4):**

Subcontractors

☑ **Additional information regarding subcontractor fleets and/or certificates will be submitted within five (5) calendar days of the bid opening.**

FAILURE TO PROVIDE THE CERTIFICATES OF REPORTED COMPLIANCE AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE.

Guaranty Section 006536 - 1

Optional: Vendor is not required to complete.

CONTRACT NO: 24-S-14

This guaranty shall be executed by the successful bidder in accordance with Section 2.32 of the General Conditions. The bidder may execute the guaranty on this page at the time of submitting the bid or may, in the alternative, submit it with the insurance certificates and bonds within ten (10) days after award.

G U A R A N T Y

To the Owner: County of Fresno

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with each individual Work Order Detailed Scope of Work and specifications, due to any of the above causes, all within 365 calendar days after the date on which the Work under this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner. If the undersigned shall fail or refuse to comply with his or her obligations under this guaranty, the Owner shall be entitled to all costs and expenses reasonably incurred by reason of said failure or refusal.

Date: *

04/03/2025

Name (Printed): *

Marc Kerkochian

Signature: *

Marc Kerkochian

Title: *

President

Contractor: *

Better Enterprises, Inc.

Required Documents

Name	Omission Terms	Submitted Fil
Electronic Bid Bond - Scan of Bid Bond Scan of Notarized Paper Bid Bond with original due by 4pm on the 5th calendar day after the bid opening.	I have already provided a bid bond, i.e. through an electronic Surety above or to the public works office prior to the deadline.	County of Fresno DPH Baseme Bond.pdf
Disclosure of Lobbying Activities - Section 004566 Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352	Submit disclosure if needed.	I am not enclosing this docume omission terms have been met
CARB Certification of Reported Compliance - Bidder Valid CARB Certification of Reported Compliance - Bidder	Does not have a fleet subject to this regulation.	I am not enclosing this docume omission terms have been met
CARB Certification(s) of Reported Compliance - Subcontractors Valid CARB Certification(s) of Reported Compliance - Subcontractors	Due by 4pm on the 5th calendar day after bid opening or no listed subcontractors have a fleet subject to this regulation.	BFI E149998_FleetwideCompliance
4 Required Documents		

Additional Documents (use if needed)

Name	Omission Terms	Submitted File
Not Required - Extra Space if needed Not Required - Extra Space if needed	Not Required - Extra Space if needed	I am not enclosing this document because the omission terms have been met.
Not Required - Extra Space if needed Not Required - Extra Space if needed	Not Required - Extra Space if needed	I am not enclosing this document because the omission terms have been met.
Not Required - Extra Space if needed Not Required - Extra Space if needed	Not Required - Extra Space if needed	I am not enclosing this document because the omission terms have been met.
3 Required Documents		

Nationwide Mutual Insurance Company

Home Office: Columbus, Ohio
Surety Administrative Office:
1100 Locust Street – Dept. 2006
Des Moines, IA 50391-2006

BID BOND

Nationwide Mutual Insurance Company vouches that this document conforms to American Institute of Architects Document A310, 2010 Edition.

CONTRACTOR: (*Name, legal status and address*)
BETTER ENTERPRISES, INC.
1148 N. Cypress Avenue
Fresno, CA 93727

SURETY: (*Name, legal status and principal place of business*)
Nationwide Mutual Insurance Company
1100 Locust Street – Dept. 2006
Des Moines, IA 50391-2006

OWNER: (*Name, legal status and address*)
COUNTY OF FRESNO
2220 Tulare St., 7th Floor
Fresno, CA
93721

BOND AMOUNT: **TEN PERCENT (10%) OF AMOUNT BID**

PROJECT: (*Name, location or address, and Project number, if any*) Department of Public Health Basement Renovation Contract Number: 24-S-14

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed, and sealed this 27th day of March, 2025.

(Witness to Principal)

(Principal's Signature) (Seal)

President
(Title)

(Witness to Surety)

Nationwide Mutual Insurance Company
(Surety) (Seal)

By:
Karen Amin, Attorney-in-Fact

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Fresno)

On 03-28-2025 before me, Ben Emerzian
(insert name and title of the officer)

personally appeared Marc Kerkochian,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

BEN EMERZIAN
Notary Public - California
Fresno County
Commission # 2450346
My Comm. Expires Jul 2, 2027

Signature Ben Emerzian (Seal)

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of San Joaquin)

On March 27, 2025 before me, Jennifer Loper, Notary Public
(insert name and title of the officer)

personally appeared Karen Amin,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity(~~ies~~), and that by ~~his~~/her/~~their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

JENNIFER LOPER
Notary Public - California
San Joaquin County
Commission # 2508440
My Comm. Expires Jan 27, 2029

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS THAT:

Nationwide Mutual Insurance Company, an Ohio corporation

hereinafter referred to severally as the "Company" and collectively as "the Companies" does hereby make, constitute and appoint:

DANIEL M CONNOLLY; JENNIFER LOPER; KAREN AMIN;

each in their individual capacity, its true and lawful attorney-in-fact, with full power and authority to sign, seal, and execute on its behalf any and all bonds and undertakings, and other obligatory instruments of similar nature, in penalties not exceeding the sum of

UNLIMITED

and to bind the Company thereby, as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Company; and all acts of said Attorney pursuant to the authority given are hereby ratified and confirmed.

This power of attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the board of directors of the Company:

"RESOLVED, that the president, or any vice president be, and each hereby is, authorized and empowered to appoint attorneys-in-fact of the Company, and to authorize them to execute and deliver on behalf of the Company any and all bonds, forms, applications, memorandums, undertakings, recognizances, transfers, contracts of indemnity, policies, contracts guaranteeing the fidelity of persons holding positions of public or private trust, and other writings obligatory in nature that the business of the Company may require; and to modify or revoke, with or without cause, any such appointment or authority; provided, however, that the authority granted hereby shall in no way limit the authority of other duly authorized agents to sign and countersign any of said documents on behalf of the Company."

"RESOLVED FURTHER, that such attorneys-in-fact shall have full power and authority to execute and deliver any and all such documents and to bind the Company subject to the terms and limitations of the power of attorney issued to them, and to affix the seal of the Company thereto; provided, however, that said seal shall not be necessary for the validity of any such documents."

This power of attorney is signed and sealed under and by the following bylaws duly adopted by the board of directors of the Company.

Execution of Instruments. Any vice president, any assistant secretary or any assistant treasurer shall have the power and authority to sign or attest all approved documents, instruments, contracts, or other papers in connection with the operation of the business of the company in addition to the chairman of the board, the chief executive officer, president, treasurer or secretary; provided, however, the signature of any of them may be printed, engraved, or stamped on any approved document, contract, instrument, or other papers of the Company.

IN WITNESS WHEREOF, the Company has caused this instrument to be sealed and duly attested by the signature of its officer the 20th day of August, 2021.

Antonio C. Albanese, **Vice President** of Nationwide Mutual Insurance Company

ACKNOWLEDGMENT

STATE OF NEW YORK COUNTY OF NEW YORK: ss

On this 20th day of August, 2021, before me came the above-named officer for the Company aforesaid, to me personally known to be the officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, deposes and says, that he is the officer of the Company aforesaid, that the seal affixed hereto is the corporate seal of said Company, and the said corporate seal and his signature were duly affixed and subscribed to said instrument by the authority and direction of said Company.

Stephanie Rubino McArthur
Notary Public, State of New York
No. 02MC6270117
Qualified in New York County
Commission Expires October 19, 2024

Notary Public
My Commission Expires
October 19, 2024

CERTIFICATE

I, Laura B. Guy, Assistant Secretary of the Company, do hereby certify that the foregoing is a full, true and correct copy of the original power of attorney issued by the Company; that the resolution included therein is a true and correct transcript from the minutes of the meetings of the boards of directors and the same has not been revoked or amended in any manner; that said Antonio C. Albanese was on the date of the execution of the foregoing power of attorney the duly elected officer of the Company, and the corporate seal and his signature as officer were duly affixed and subscribed to the said instrument by the authority of said board of directors; and the foregoing power of attorney is still in full force and effect.

IN WITNESS WHEREOF, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of said Company this 27th day of March, 2025.

Assistant Secretary

BDJ 1(08-21)00

Affirmation of Fleet Wide Compliance

Certification ID: 167154

This certificate affirms that

Entity ID: E149998
Better Flooring, Inc.
1148 N Cypress Ave
Fresno, CA 93727

has attested in the Clean Truck Check electronic reporting system to report a complete list of vehicles subject to Heavy-Duty Inspection and Maintenance (HD I/M) Regulation and the California Air Resources Board (CARB) hereby verifies that as of 3/27/2025, all of the attested vehicles are compliant with the Clean Truck Check.*

A complete list of the attested vehicles is listed in the following page(s).

*This Affirmation of Fleet Wide Compliance shall be used for the fleet's purposes of proving their fleet compliance status with their freight contractors and brokers. This Affirmation of Fleet Wide Compliance shall not constitute proof of a vehicle compliance with the Clean Truck Check beyond the issued date.

S.No	VIN Numbers
1	1FVHCYCY8FHGH4419
2	1FDUF4HTXFEC98358

County of Fresno

DEPARTMENT OF PUBLIC WORKS AND PLANNING
STEVEN E. WHITE, DIRECTOR

July 1, 2025

Marc Kerkochian, President
Better Enterprises, Inc.
1148 N Cypress Ave
Fresno, CA 93727

Transmitted by email to: marc@betterenterprisesinc.com

Dear Marc Kerkochian:

Subject: Notice of Approval, Department of Public Health Basement Renovation
Contract No. 24-S-14

The contract between your firm and the County of Fresno for the referenced project became operative on June 24, 2025. A copy of the executed contract is enclosed.

A "Notice to Proceed" authorizing commencement of the work will be issued by the Construction Engineer.

DIR Project ID 20250583882 is assigned to Contract No. 24-S-14

The enclosed copy of Section 41 of the Charter of the County of Fresno is for your reference and compliance. If you have any questions contact Jennica Geddert at jgeddert@fresnocountyca.gov or (559) 353-4919.

Sincerely,

Mohammad Alimi, Ph.D., P.E.
Design Division Engineer

Jennica Geddert

Digitally signed by Jennica Geddert
Date: 2025.07.01 09:39:02 -07'00'

Jennica Geddert
Senior Staff Analyst

Enclosures

cc: Board of Supervisors
Auditor – Controller
Financial Services
Construction Management
Design Division – Design Services

SURETY VERIFICATION

(Complete and return with Performance and Payment Bonds)

PROJECT Department of Public Health Basement Renovation

Contract No. 24-S-14

Contractor BETTER ENTERPRISES, INC.

Contact Person Joyce Tahira Phone No. (925) 413-8028

SURETY COMPANY (Exact Name Style, Home Office Address)

NATIONWIDE MUTUAL INSURANCE COMPANY

1100 Locust St., Ste. 2006

Des Moines, IA 50391

AGENT / BROKER

Attorney-in-fact Karen Amin Phone No. (209) 333-1136

Firm ALLIANT INSURANCE SERVICES, INC.

Mail Address 641 S. Ham Ln., Ste. B

City, State, ZIP Lodi, CA 95242

CA Dept of Insurance License No. 0C02028 Expires 03 / 31 / 2027
(or attach copy of License)

Owner's use only

Received _____ / _____ / _____ By _____

Surety admitted _____ / _____ / _____

Surety Best's Class _____ Rating _____

Comments

_____

_____

\dsform\PW180G

NATIONWIDE MUTUAL INSURANCE COMPANY SURETY COMPANY

PAYMENT BOND - PUBLIC WORK
SECTIONS 3247 - 3252, CIVIL CODE
(CALIFORNIA)

Bond No. 7901171549
Premium: $59,591.00

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, The COUNTY OF FRESNO has awarded to BETTER ENTERPRISES, INC.

as Contractor, a contract for the work described as follows: Department of Public Health Basement Renovation Contract No. 24-S-14.

AND WHEREAS, Said Contractor is required to furnish a bond in connection with said contract, to secure the payment of claims of laborers, mechanics, materialmen, and other persons as provided by law.

NOW, THEREFORE, We the undersigned Contractor and Surety are held and firmly bound unto the **County of Fresno** in the amount required by law, the sum of $**6,763,000.00**, for which payment well and truly to be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

That if said Contractors shall fail to pay (1) Any of the persons named in Civil Code Section 3181, (2) amounts due under the Unemployment Insurance Code for work or labor performed in connection with said contract by any such claimant, or (3) any amounts required to be deducted, withheld and paid over to the Employment Development Department and to the Franchise Tax Board from wages of the employees of Contractor and his sub-contractors with respect to such work and labor, pursuant to Section 13020 of the Unemployment Insurance Code, then the Surety or Sureties herein will pay for the same in an aggregate amount not exceeding the sum specified in this bond, and also in case suit is brought upon the bond, a reasonable attorney's fee, to be fixed by the court, otherwise the above obligation shall be void.

This bond shall inure to the benefit of any of the persons named in Civil Code Section 3181 so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

This bond is executed and filed to comply with the provisions of the act of Legislature of the State of California as designated in Civil Code, Sections 3247 - 3252 inclusive, and all amendments thereto.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this 21st day of May, 2025.

BETTER ENTERPRISES, INC.

By _____
Marc Kerkorian, President Contractor

NATIONWIDE MUTUAL INSURANCE COMPANY SURETY COMPANY

By _____
Karen Amin, Attorney-in-Fact

S-2061-B (07-97)

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Fresno)

On 05-27-2025 before me, Ben Emerzian
(insert name and title of the officer)

personally appeared Marc Kerkechian,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

BEN EMERZIAN
Notary Public - California
Fresno County
Commission # 2450346
My Comm. Expires Jul 2, 2027

Signature Ben Emerzian (Seal)

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of San Joaquin)

On May 21, 2025 before me, Jennifer Loper, Notary Public
(insert name and title of the officer)

personally appeared Karen Amin,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity(~~ies~~), and that by ~~his~~/her/~~their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

JENNIFER LOPER
Notary Public - California
San Joaquin County
Commission # 2508440
My Comm. Expires Jan 27, 2029

Signature Jennifer Loper (Seal)

Bond No. 7901171549

Premium: Included in Conjunction with Performance Bond

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Performance Bond

CONTRACTOR:
(Name, legal status and address)

BETTER ENTERPRISES, INC.
1148 N. Cypress Avenue
Fresno, CA 93727

SURETY:
(Name, legal status and principal place of business)

NATIONWIDE MUTUAL INSURANCE COMPANY
1100 Locust St., Ste. 2006
Des Moines, IA 50391

Mailing Address for Notices

NATIONWIDE MUTUAL INSURANCE COMPANY
1100 Locust St., Ste. 2006
Des Moines, IA 50391

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)

COUNTY OF FRESNO
2220 Tulare Street, 6th Floor
Fresno, CA 93721

CONSTRUCTION CONTRACT
Date: May 20, 205

Amount: $ 6,763,000.00

Description:
(Name and location) Department of Public Health Basement Renovation
Contract No. 24-S-14

BOND
Date: May 21, 2025

(Not earlier than Construction Contract Date)

Amount: $ 6,763,000.00

Modifications to this Bond: [X] None [ ] See Section 16

CONTRACTOR AS PRINCIPAL

Company: BETTER ENTERPRISES, INC. *(Corporate Seal)*

Signature: Marc Kartoozian

Name and Title: President

SURETY

Company: NATIONWIDE MUTUAL INSURANCE COMPANY *(Corporate Seal)*

Signature:

Name and Title: Karen Amin
Attorney-in-Fact

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

ALLIANT INSURANCE SERVICES, INC.
641 S. Ham Ln., Ste. B
Lodi, CA 95242
(209) 333-1136

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:) n/a

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:
Address

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:
Address

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Fresno)

On 05-27-2025 before me, Ben Emerzian
(insert name and title of the officer)

personally appeared Marc Kerkchian,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

BEN EMERZIAN
Notary Public - California
Fresno County
Commission # 2450346
My Comm. Expires Jul 2, 2027

Signature Ben Emerzian (Seal)

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of San Joaquin)

On May 21, 2025 before me, Jennifer Loper, Notary Public
(insert name and title of the officer)

personally appeared Karen Amin,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

JENNIFER LOPER
Notary Public - California
San Joaquin County
Commission # 2508440
My Comm. Expires Jan 27, 2029

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS THAT:

Nationwide Mutual Insurance Company, an Ohio corporation

hereinafter referred to severally as the "Company" and collectively as "the Companies" does hereby make, constitute and appoint:

DANIEL M CONNOLLY; JENNIFER LOPER; KAREN AMIN;

each in their individual capacity, its true and lawful attorney-in-fact, with full power and authority to sign, seal, and execute on its behalf any and all bonds and undertakings, and other obligatory instruments of similar nature, in penalties not exceeding the sum of

UNLIMITED

and to bind the Company thereby, as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Company; and all acts of said Attorney pursuant to the authority given are hereby ratified and confirmed.

This power of attorney is made and executed pursuant to and by authority of the following resolution duly adopted by the board of directors of the Company:

"RESOLVED, that the president, or any vice president be, and each hereby is, authorized and empowered to appoint attorneys-in-fact of the Company, and to authorize them to execute and deliver on behalf of the Company any and all bonds, forms, applications, memorandums, undertakings, recognizances, transfers, contracts of indemnity, policies, contracts guaranteeing the fidelity of persons holding positions of public or private trust, and other writings obligatory in nature that the business of the Company may require; and to modify or revoke, with or without cause, any such appointment or authority; provided, however, that the authority granted hereby shall in no way limit the authority of other duly authorized agents to sign and countersign any of said documents on behalf of the Company."

"RESOLVED FURTHER, that such attorneys-in-fact shall have full power and authority to execute and deliver any and all such documents and to bind the Company subject to the terms and limitations of the power of attorney issued to them, and to affix the seal of the Company thereto; provided, however, that said seal shall not be necessary for the validity of any such documents."

This power of attorney is signed and sealed under and by the following bylaws duly adopted by the board of directors of the Company.

Execution of Instruments. Any vice president, any assistant secretary or any assistant treasurer shall have the power and authority to sign or attest all approved documents, instruments, contracts, or other papers in connection with the operation of the business of the company in addition to the chairman of the board, the chief executive officer, president, treasurer or secretary; provided, however, the signature of any of them may be printed, engraved, or stamped on any approved document, contract, instrument, or other papers of the Company.

IN WITNESS WHEREOF, the Company has caused this instrument to be sealed and duly attested by the signature of its officer the 20th day of August, 2021.

Antonio C. Albanese, **Vice President** of Nationwide Mutual Insurance Company

ACKNOWLEDGMENT

STATE OF NEW YORK COUNTY OF NEW YORK: ss

On this 20th day of August, 2021, before me came the above-named officer for the Company aforesaid, to me personally known to be the officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, deposes and says, that he is the officer of the Company aforesaid, that the seal affixed hereto is the corporate seal of said Company, and the said corporate seal and his signature were duly affixed and subscribed to said instrument by the authority and direction of said Company.

Stephanie Rubino McArthur
Notary Public, State of New York
No. 02MC6270117
Qualified in New York County
Commission Expires October 19, 2024

Notary Public
My Commission Expires
October 19, 2024

CERTIFICATE

I, Laura B. Guy, Assistant Secretary of the Company, do hereby certify that the foregoing is a full, true and correct copy of the original power of attorney issued by the Company; that the resolution included therein is a true and correct transcript from the minutes of the meetings of the boards of directors and the same has not been revoked or amended in any manner; that said Antonio C. Albanese was on the date of the execution of the foregoing power of attorney the duly elected officer of the Company, and the corporate seal and his signature as officer were duly affixed and subscribed to the said instrument by the authority of said board of directors; and the foregoing power of attorney is still in full force and effect.

IN WITNESS WHEREOF, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of said Company this 21st day of May, 2025.

Assistant Secretary

BDJ 1(08-21)00

Bid Summary
Fresno County Department of Public Works and Planning

Project: DPH Basement Renovation
Contract No.: 24-S-14

Bid Opening: 04/03/25
Scheduled Award Date: 05/20/25

Bidders

1. Better Enterprises, Inc.
1148 N Cypress Ave, Fresno, CA 93727-6871

Subcontractors

Better Flooring, Inc., Best Fire Protection, Western Building Materials Co., KC&S Construction Specialties, Inc., Fresno Roofing Co., Inc., Shelco Industries, Cencal Services, Inc., Alcal Specialty Contracting, Inc., Valley Air Conditioning & Repair, Inc., San Joaquin Glass, Frontline Plastering, Inc., Tarlton & Son, Inc., EI Executive Interiors, Strategic Mechanical, Inc., The Boelter Companies, Inc., Meyers Constructors, Inc., A-C Electric Company

2. Fortune-Ratliff General Contractors, Inc.
352 West Bedford Suite 107, Fresno, CA 93711

MD Concrete Cutting & Demo, A-C Electric Co., Celtic Construction, Inc., Doug De Leo Welding, Inc., Woodwork, Inc., Legacy Insulation, Legacy Insulation, KC&S Construction Specialties, Inc., San Joaquin Glass, Jackson-Young Drywall, Inc., JD Ballard & Sons Tile & Marble Co., Ceiling Experts, Amparan Flooring, Ro's Precise Painting, Partition Specialties, Inc., Shelco Industries, Johnson Fire Protection

3. Katch Environmental, Inc. dba Katch General
929 L St, Fresno, CA 93721-2616

Alcal Specialty Contracting Inc, Doug Deleo Welding Inc, D-One Drywall Services Inc, Woodwork Inc, Legacy Insulation Inc, KC&S Construction Specialties Inc, Fresno Shelfrac Specialties Inc Dba Shelco Industries, Fire System Solutions Inc, Ro's Precise Painting Inc, Optimal Tile Inc, Valley Unique Electric Inc Dba Valley Unique Electric, Ultra Ceiling Inc, DFS Flooring LP, Central Cal Plumbing Inc, Bay Cities Fire Protection Inc, Strategic Mechanical Inc, Cash & Lincoln Fence Co Dba Valley Fence Co

4. AMG & Associates, Inc.
26535 Summit Circle, Santa Clarita, CA 91350

Celtic, Woodwork Inc, KC&S, San Joaquin Glass, D-One Drywall, J Dean Ballard, Western Building, Quality Carpets, Ro's Precise, Kroeker, Shelco, Johnson Fire, Fresno Plumbing, Strategic Mech, Valley Unique, Integrated, Alcal

	Total Bid
Architect's Estimate	**$8,800,000.00**
1. Better Enterprises, Inc.	**$6,763,000.00**
2. Fortune-Ratliff General Contractors, Inc.	**$7,800,000.00**
3. Katch Environmental, Inc. dba Katch General	**$7,822,532.00**
4. AMG & Associates, Inc.	**$8,268,000.00**