

ORCUTT UNION SCHOOL DISTRICT
ORCUTT JUNIOR HIGH SCHOOL
WALK-IN COOLER/FREEZER

DSA #03-123348

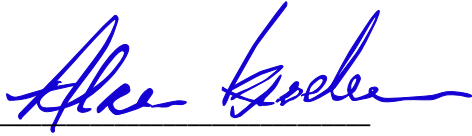
PROJECT SPECIFICATIONS
DSA SUBMITTAL

DEC. 14, 2023



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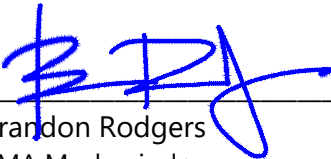
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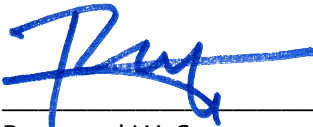
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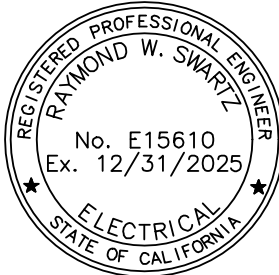
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IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-123348 INC:
REVIEWED FOR
SS FLS ACS
DATE: 02/14/2024

TABLE OF CONTENTS

DIVISION 1 - GENERAL REQUIREMENTS

| | | |
|---|------|------------|
| 01 11 00 Summary of Work | OUSD | 01 11 00-1 |
| 01 12 10 Contract Forms and Submittals | OUSD | 01 12 10-1 |
| 01 20 00 Price and Payment Procedures | OUSD | 01 20 00-1 |
| 01 21 00 Allowances | OUSD | 01 21 00-1 |
| 01 23 00 Alternates and Unit Pricing | OUSD | 01 23 00-1 |
| 01 25 10 Product Options and Substitutions | OUSD | 01 25 10-1 |
| 01 26 00 Contract Modification Procedures | OUSD | 01 26 00-1 |
| 01 26 10 Requests for Information | OUSD | 01 26 10-1 |
| 01 31 00 Coordination and Project Meetings | OUSD | 01 31 00-1 |
| 01 32 16 Construction Schedule – Network Analysis | OUSD | 01 32 16-1 |
| 01 33 00 Submittals | OUSD | 01 33 00-1 |
| 01 40 00 Quality Requirements | OUSD | 01 40 00-1 |
| 01 42 13 Abbreviations and Acronyms | OUSD | 01 42 13-1 |
| 01 42 16 General Definitions and References | OUSD | 01 42 16-1 |
| 01 45 29 Testing Laboratory Services | OUSD | 01 45 29-1 |
| 01 50 00 Temporary Facilities and Controls | OUSD | 01 50 00-1 |
| 01 52 10 Site Standards | OUSD | 01 52 10-1 |
| 01 60 00 Materials and Equipment | OUSD | 01 60 00-1 |
| 01 66 10 Delivery, Storage and Handling | OUSD | 01 66 10-1 |
| 01 73 00 Execution | OUSD | 01 73 00-1 |
| 01 73 10 Cutting and Patching | OUSD | 01 73 10-1 |
| 01 77 00 Contract Closeout and Final Cleaning | OUSD | 01 77 00-1 |
| 01 78 23 Operation and Maintenance Data | OUSD | 01 78 23-1 |
| 01 78 36 Warranties | OUSD | 01 78 36-1 |
| 01 78 39 Record Documents | OUSD | 01 78 39-1 |

DIVISION 2 – EXISTING CONDITIONS

| | | |
|------------------------------|-------|------------|
| 02 20 00 Earthwork | 19six | 02 20 00-1 |
| 02 23 00 Site Clearing | 19six | 02 23 00-1 |
| 02 41 16 Building Demolition | 19six | 02 41 16-1 |

DIVISION 3 – CONCRETE

| | | |
|---------------------------------|-------|------------|
| 03 10 00 Concrete Formwork | 19six | 03 10 00-1 |
| 03 20 00 Concrete Reinforcing | 19six | 03 20 00-1 |
| 03 30 00 Cast-In-Place Concrete | 19six | 03 30 00-1 |

DIVISION 5 – METALS

| | | |
|------------------------------------|-------|------------|
| 05 12 00 Structural Steel | 19six | 05 12 00-1 |
| 05 40 00 Cold-Formed Metal Framing | 19six | 05 40 00-1 |

DIVISION 6 – WOODS, PLASTICS AND COMPOSITES

| | | |
|--|-------|------------|
| 06 05 73 Fire Retardant Wood Treatment | 19six | 06 05 73-1 |
| 06 10 00 Rough Carpentry | 19six | 06 10 00-1 |

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

| | | |
|--|-------|------------|
| 07 54 16 Single Ply Membrane Roofing | 19six | 07 54 16-1 |
| 07 62 00 Sheet Metal Flashing and Trim | 19six | 07 62 00-1 |
| 07 65 00 Flexible Sheet Flashing | 19six | 07 65 00-1 |
| 07 72 00 Roof Accessories | 19six | 07 72 00-1 |
| 07 92 00 Joint Sealants | 19six | 07 92 00-1 |

DIVISION 8 - OPENINGS

| | | |
|---------------------------------|-------|------------|
| 08 11 00 Steel Doors and Frames | 19six | 08 11 00-1 |
|---------------------------------|-------|------------|

DIVISION 9 – FINISHES

| | | |
|--|-------|------------|
| 09 29 00 Gypsum Board | 19six | 09 29 00-1 |
| 09 30 13 Ceramic Tile | 19six | 09 30 13-1 |
| 09 65 00 Resilient Flooring | 19six | 09 65 00-1 |
| 09 65 13 Resilient Base and Accessories | 19six | 09 65 13-1 |
| 09 70 00 Fiber-Reinforced Plastic (FRP) Panels | 19six | 09 70 00-1 |
| 09 91 00 Painting | 19six | 09 91 00-1 |

DIVISION 10 – SPECIALTIES

| | | |
|--------------------------------------|-------|------------|
| 10 28 00 Toilet and Bath Accessories | 19six | 10 28 00-1 |
|--------------------------------------|-------|------------|

DIVISION 13 – SPECIAL CONSTRUCTION

| | | |
|--------------------------------------|-------|------------|
| 13 21 26 Walk-In Refrigeration Units | 19six | 13 21 26-1 |
|--------------------------------------|-------|------------|

DIVISION 22 – PLUMBING

| | | |
|-------------------|-----|------------|
| 22 00 00 Plumbing | BMA | 22 00 00-1 |
|-------------------|-----|------------|

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

| | | |
|---|-----|------------|
| 23 00 00 Heating, Ventilation, and Air Conditioning | BMA | 23 00 00-1 |
| 23 00 13 General Mechanical Requirements | BMA | 23 00 13-1 |

DIVISION 26 – ELECTRICAL

| | | |
|--|-------|------------|
| 26 00 00 General Electrical Specifications | tk1sc | 26 00 00-1 |
|--|-------|------------|

DIVISION 31 – EARTHWORK

| | | |
|------------------------|-------|------------|
| 31 10 00 Site Clearing | 19six | 31 10 00-1 |
|------------------------|-------|------------|

DIVISION 32 – EXTERIOR IMPROVEMENTS

Orcutt Union School District
Orcutt Junior High School Walk-In Cooler/Freezer
Construction Documents

Project # 03-123348

32 13 13 Concrete Paving

19six 32 13 13-1

END OF TABLE OF CONTENTS

DOCUMENT 01 11 00

SUMMARY OF WORK

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Submittals; and
- 1.1.5. Temporary Facilities and Controls.

1.2. SUMMARY OF WORK COVERED BY CONTRACT DOCUMENTS

The Work may consist of the following:

- 1.2.1. Demolition of the existing walk-in cooler & freezer in Building 600 and the installation of a new and larger walk-in cooler and freezer with the associated vestibule (with a total of 740 SF) walls and roofing. Also included is the demolition and construction of associated site work.

1.3. CONTRACTS

Perform the Work under a single, fixed-price Contract.

1.4. DEFERRED APPROVAL ITEMS

- 1.4.1. All items that are subject to subsequent review and approval by the Division of the State Architect shall be as indicated below. No deferred approval items shall be installed until the Contractor has complied with all the processes in the Contract Documents, including Division 01 Document "Submittals."
- 1.4.2. Deferred approval items for this Project are the following:

None.

1.5. SPECIAL PROJECT REQUIREMENTS

- 1.5.1. Hours of Work: Work is to be performed during regular work hours. Contractor shall coordinate its operations with activities taking place at each campus such as summer school. Contractor shall ensure that there are no disruptions to such activities.

1.6. WORK BY OTHERS

- 1.6.1. Work to be performed and completed prior to the start of the Project:-[N/A]

1.7. CODES, REGULATIONS AND STANDARDS

- 1.7.1. The codes, regulations, and standards adopted by the State and federal agencies having jurisdiction shall govern minimum requirements for the Project. Where codes, regulations, and standards conflict with the Contract Documents, these conflicts shall be brought to the immediate attention of the District and the Architect.
- 1.7.2. Codes, regulations, and standards are as published effective as of date of bid opening, unless otherwise specified or indicated.

1.8. EXAMINATION OF EXISTING CONDITIONS

- 1.8.1. Contractor shall be held to have examined the Project Site and acquainted itself with the conditions of the Site and of the streets and roads approaching the Site.
- 1.8.2. Prior to commencement of Work, Contractor shall survey the Site and existing buildings and improvements to observe existing damage and defects such as cracks, sags, broken, missing or damaged glazing, other building elements and Site improvements, and other damage.
- 1.8.3. Should Contractor observe cracks, sags, and other damage to and defects of the Site and adjacent buildings, paving, and other items not indicated in the Contract Documents, Contractor shall immediately report same to the District and the Architect.

1.9. CONTRACTOR'S USE OF PREMISES

- 1.9.1. Contractor shall take all reasonable precautions for the safety of the students and the school employees throughout the duration of the Project.
- 1.9.2. If unoccupied and only with District's prior written approval, Contractor may use the building(s) at the Project Site without limitation for its operations, storage, and office facilities for the performance of the Work. If the District chooses to beneficially occupy any building(s), Contractor must obtain the District's written approval for Contractor's use of spaces and types of operations to be performed within the building(s) while so occupied. Contractor's access to the building(s) shall be limited to the areas indicated.
- 1.9.3. If the space at the Project Site is not sufficient for Contractor's operations, storage, office facilities and/or parking, Contractor shall arrange and pay for any additional facilities needed by Contractor, at no expense to District.
- 1.9.4. Contractor shall not interfere with others use of or access to occupied portions of the building(s) or adjacent property.
- 1.9.5. Contractor shall maintain corridors, stairs, halls, and other exit-ways of building clear and free of debris and obstructions at all times.

- 1.9.6. No one other than those directly involved in the demolition and construction or specifically designated by the District or the Architect shall be permitted in the areas of Work during demolition and construction activities.

1.10. PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- 1.10.1. The Drawings show above-grade and below-grade structures, utility lines, and other installations that are known or believed to exist in the area of the Work. Contractor shall locate these existing installations before proceeding with excavation and other operations that could damage same; maintain them in service, where appropriate; and repair damage to them caused by the performance of the Work. Should damage occur to these existing installations, the costs of repair shall be at the Contractor's expense and made to the District's satisfaction.
- 1.10.2. Contractor shall be alert to the possibility of the existence of additional structures and utilities. If Contractor encounters additional structures and utilities, Contractor will immediately report to the District for disposition of same as indicated in the General Conditions.

1.11. UTILITY SHUTDOWNS AND INTERRUPTIONS

- 1.11.1. Contractor shall give the District a minimum of three (3) days written notice in advance of any need to shut off existing utility services or to effect equipment interruptions. District will set exact time and duration for shutdown, and will assist Contractor with shutdown. Work required to re-establish utility services shall be performed by the Contractor.
- 1.11.2. Contractor shall obtain District's written approval as indicated in the General Conditions in advance of deliveries of material or equipment or other activities that may conflict with District's use of the building(s) or adjacent facilities.

1.12. STRUCTURAL INTEGRITY

- 1.12.1. Contractor shall be responsible for and supervise each operation and work that could affect structural integrity of various building elements, both permanent and temporary.
- 1.12.2. Contractor shall include structural connections and fastenings as indicated or required for complete performance of the Work.

1.13. ENVIRONMENTAL REQUIREMENTS

- 1.13.1. To the extent possible, materials, processes, procedures, and equipment included in these Specifications shall comply with sustainable design practices.

END OF DOCUMENT

DOCUMENT 01 12 10

CONTRACT FORMS AND SUBMITTALS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Submittals; and
- 1.1.5. Construction Schedule.

2. REQUIREMENTS OF THE DISTRICT

2.1. Contractor shall utilize the District's forms as indicated below and as attached hereto. This requirement also applies to submittals, including the requirement that the Contractor and its Subcontractors, as indicated, utilize the software, internet and specific programs on this Project as indicated herein.

2.2. The link to the District's on-line document, submittal, and forms program can be found at: http://www.orcuttschools.net/construction_bid_documents.

2.3. DISTRICT FORMS

All forms identified below shall utilize District forms available at the above referenced link. Contractor must only utilize these forms, including the programs, processes and software indicated below.

- 2.3.1. **Request for Information.** Contractor shall comply with all applicable provisions in Contract Documents relating to Requests for Information. Contractor shall submit all of its Requests for Information using District's Form attached hereto.
- 2.3.2. **Construction Directive.** Contractor shall comply with all applicable provisions in Contract Documents relating to Changes in the Work. All Construction Directives shall be issued using District's Form attached hereto.
- 2.3.3. **Price Request.** Contractor shall comply with all applicable provisions in Contract Documents relating to Price Requests. All Price Requests shall be issued using District's Form attached hereto.
- 2.3.4. **Proposed Change Order.** Contractor shall comply with all applicable provisions in Contract Documents relating to Changes in the Work. Contractor shall submit all of its Proposed Change Orders using District's Form attached hereto.

- 2.3.5. **Change Order.** Contractor shall comply with applicable provisions in Contract Documents relating to Changes in the Work. All Change Orders shall be issued using District's Form attached hereto.

2.4. CONTRACTOR SUBMITTALS

All submittals required by the Contract Documents shall be submitted using the programs, processes and software indicated below. If no specific program or format is indicated, then Microsoft Word or Microsoft Excel is acceptable.

- 2.4.1. **Preliminary Construction Schedule**

- 2.4.1.1. Utilize Procore.

- 2.4.2. **Schedule of Values**

- 2.4.2.1. Utilize PCM or another program if pre-approved by the District.

- 2.4.3. **Contractor's Completed Subcontractor List**

- 2.4.4. **Contractor's Safety Plan**

- 2.4.5. **Schedule of Submittals**

- 2.4.5.1. Utilize PCM or another program if pre-approved by the District.

- 2.4.6. **Operations and Maintenance Manual & Instructions**

END OF DOCUMENT

DOCUMENT 01 20 00

PRICE AND PAYMENT PROCEDURES

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any).

1.2. DESCRIPTION

- 1.2.1. This Document contains procedures to be followed by the Contractor to request payment.
- 1.2.2. **IF THERE IS ANY INCONSISTENCY IN THIS DOCUMENT WITH THE PROVISIONS IN THE GENERAL CONDITIONS AND THE SPECIAL CONDITIONS THAT THE CONTRACTOR SHALL COMPLY WITH RELATED TO CHANGES AND/OR REQUESTS FOR CHANGES (e.g., "PAYMENTS," "SCHEDULE OF VALUES"), THOSE PROVISIONS IN THE GENERAL CONDITIONS AND THE SPECIAL CONDITIONS SHALL TAKE PRECEDENCE.**

1.3. SECTION INCLUDES

- 1.3.1. Schedule of Values.
- 1.3.2. Application for Payment.

1.4. SCHEDULE OF VALUES

- 1.4.1. Provide a breakdown of the Contract Price with enough detail to facilitate continued evaluation of Applications for Payment and Progress Reports.
- 1.4.2. Contractor must update and resubmit the Schedule of Values before the next Invoice or Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Price.
- 1.4.3. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. Comply with the provisions in the General Conditions regarding the Schedule of Values.
 - 1.4.3.1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - 1.4.3.1.1. Application for Payment forms.

- 1.4.3.1.2. Submittal Schedule.
- 1.4.3.1.3. Contractor's Construction Schedule.
- 1.4.3.2. Submit the Schedule of Values to District as indicated in the Contract Documents and, if an updated Schedule of Values is needed, then no later than ten (10) days before the date scheduled for submittal of the next Application(s) for Payment.
- 1.4.3.3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- 1.4.4. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1.4.4.1. Identification: Include the following Project identification on the Schedule of Values:
 - 1.4.4.1.1. Project name and location.
 - 1.4.4.1.2. Name of District's Representative.
 - 1.4.4.1.3. District's contract number (_____).
 - 1.4.4.1.4. District's name and address.
 - 1.4.4.1.5. Date of submittal.
 - 1.4.4.2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - 1.4.4.2.1. Related Specification document, section or division.
 - 1.4.4.2.2. Description of the Work.
 - 1.4.4.2.3. Name of subcontractor.
 - 1.4.4.2.4. Name of manufacturer or fabricator.
 - 1.4.4.2.5. Name of supplier.
 - 1.4.4.2.6. Change Orders (numbers) that affect value.
 - 1.4.4.2.7. Dollar value.
 - 1.4.4.2.7.1. Percentage of the Contract Price to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1.4.4.3. Provide a breakdown of the Contract Price in enough detail to facilitate continued evaluation of Applications for Payment and progress reports.

Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training.

- 1.4.4.4. Round amounts to nearest whole dollar; total shall equal the Contract Price.
 - 1.4.4.5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - 1.4.4.6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 - 1.4.4.7. Allowances (if any): Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 - 1.4.4.8. Each item in the Schedule of Values and Applications for Payments shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
- 1.4.5. Schedule Updating: Update and resubmit the Schedule of Values before the next Application for Payment if there is a change in the Contract Price.

1.5. APPLICATIONS FOR PAYMENT

- 1.5.1. **Form:** Contractor shall utilize AIA Form G702 - Application and Certificate for Payment and AIA Form G703 - Continuation Sheet, or District-approved form with the same information as these AIA forms.
- 1.5.2. **Content and Format:** District shall use Schedule of Values for listing items in its Application for Payment.
- 1.5.3. Each Application for Payment shall be consistent with previous applications and payments as certified and paid for by District.

END OF DOCUMENT

DOCUMENT 01 21 00

ALLOWANCES

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISION

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions including without limitation, Contract Terms and Definitions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any).
- 1.1.4. Agreement;
- 1.1.5. Bid Form; and

1.2. SUMMARY

- 1.2.1. **THE SPECIFIC ALLOWANCES FOR THIS PROJECT ARE AS LISTED IN THE AGREEMENT.**
- 1.2.2. This Document includes administrative and procedural requirements governing Allowances.
- 1.2.3. Certain items are specified in the Contract Documents by Allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements may be issued by Change Order or similar document.

1.3. SELECTION AND PURCHASE

- 1.3.1. At the earliest practical date after award of the Contract, Contractor shall advise District of the date when final selection and purchase of each product or system described by an Allowance must be completed to avoid delaying the Work.
- 1.3.2. At District's request, obtain proposals for each Allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- 1.3.3. Purchase products and systems selected by District from the designated supplier.

1.4. SUBMITTALS

- 1.4.1. Submit proposals for purchase of products or systems included in Allowances, in the form specified for Change Orders.
- 1.4.2. Submit invoices or delivery slips to show actual quantities of materials delivered to the Site for use in fulfillment of each Allowance.

- 1.4.3. Coordinate and process submittals for Allowance items in same manner as for other portions of the Work.

1.5. COORDINATION

Coordinate Allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6. PAYMENT FOR ALLOWANCES

- 1.6.1. Allowance shall include all-inclusive cost to Contractor of specific products and materials under Allowance and Contractor may bill its time, materials, and other items in the identical structure as a Change Order.

1.7. UNUSED MATERIALS

- 1.7.1. Return unused materials purchased under an Allowance to manufacturer or supplier for credit to District, after installation has been completed and accepted.
- 1.7.2. If requested, prepare and deliver unused material for storage by District when it is not economically practical (as determined by District) to return the material for credit. If directed, deliver unused material to District's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

2. EXECUTION

2.1. EXAMINATION

Examine products covered by an Allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

2.2. PREPARATION

Coordinate materials and their installation for each Allowance with related materials and installations to ensure that each Allowance item is completely integrated and interfaced with related work.

END OF DOCUMENT

DOCUMENT 01 23 00

ALTERNATES AND UNIT PRICING

1. ALTERNATES AND UNIT PRICES

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Bid Form and Proposal; and
- 1.1.5. Instruction to Bidders.

2. ALTERNATES

2.1. DESCRIPTION

An amount proposed by Contractor and stated in its Bid Form for certain work defined in the Instruction to Bidders, Bid Form or Contract Documents that may be added to or deducted from the Base Bid amount. The acceptance or rejection of any of the alternates is strictly at the option of the District and subject to District's acceptance of Contractor's stated prices contained in this Proposal.

The cost or credit for each alternate is the net addition to or deduction from the Contract Price to incorporate the alternate into the Work. No other adjustments are made to the Contract Price.

2.2. GENERAL:

- 2.2.1. Coordination: Contractor shall modify or adjust adjacent work as necessary to completely integrate work of the alternate into the Project.
 - 2.2.1.1. Include as part of each alternate, miscellaneous devices, accessories and similar items incidental to or required for a complete installation whether or not indicated as part of the alternate.
 - 2.2.1.2. Include as part of each alternate, the costs of related coordination, modification, or adjustments.
- 2.2.2. If District accepts an alternate, Contractor shall perform the work of the alternate under the same conditions as other Work required by Contract Documents.
- 2.2.3. Notification: Immediately following award of the Contract, Contractor shall notify all of its Subcontractor(s) in writing of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

- 2.2.4. Schedule of Alternates: A Schedule of Alternates is included at the end of this Document. Specifications referenced in the Schedule of Alternates contain requirements for materials necessary to achieve the Work described under each alternate.

3. UNIT PRICING

3.1. DESCRIPTION

An amount proposed by Contractor and stated in its Bid Form for certain work defined in the Instruction to Bidders and Bid Form that may be priced by unit. The acceptance or rejection of any of the unit prices is strictly at the option of the District and subject to District's acceptance of Contractor's stated prices contained in the Bid Form and may be subsequently negotiated prior to incorporation on Change Order(s).

3.2. GENERAL

Contractor shall completely state all required figures based on Unit Prices required in the Bid Form. Where scope of Work is decreased, all Work pertaining to the item, whether specifically stated or not, shall be omitted and where scope of Work is increased, all work pertaining to that item required to render same ready for use on the Project in accordance with intention of Drawings and Specifications shall be included in an agreed upon price amount.

3.3. UNIT PRICES

Furnish unit prices for each of the named items on a square foot, lineal foot, or per each basis, as requested and applicable. Unit prices shall include all labor, materials, services, profit, overhead, insurance, bonds, taxes, and all other incidental costs of Contractor, subcontractors, and supplier(s).

4. EXECUTION

4.1. SCHEDULE OF ALTERNATES

END OF DOCUMENT

DOCUMENT 01 25 10

PRODUCT OPTIONS AND SUBSTITUTIONS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any); and
- 1.1.4. Instructions to Bidders.

1.2. DOCUMENT INCLUDES

- 1.2.1. Product options.
- 1.2.2. Limitations on Substitutions.
- 1.2.3. Regulatory Requirements.
- 1.2.4. Substitution Representation.
- 1.2.5. Submittal Procedure.
- 1.2.6. District's Review.

1.3. DEFINITIONS

- 1.3.1. Requests for changes in products, materials, or equipment required by Contract Documents proposed by the Contractor prior to and after award of the Contract are considered requests for substitutions. Contractor must refer to the Instructions to Bidders, the General Conditions and the Special Conditions for limitations on when requests for substitution(s) are permitted on Project. The following are not considered substitutions:
 - 1.3.1.1. Revisions to Contract Documents requested by the District or Architect.
 - 1.3.1.2. Specified options of products, materials, and equipment included in Contract Documents.
- 1.3.2. Whenever in the Specifications any material, product, thing, or service is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be used for the purpose of facilitating the description of

the material, product, thing, or service, and shall be deemed to be followed by the words "or equal," except:

1.3.2.1. When designated to match other material, product, thing, or service in use on a particular public improvement either completed or in the course of completion;
or

1.3.2.2. When designated as a field test or experiment.

1.4. PRODUCT OPTIONS

1.4.1. **Products Specified by Reference Standards or by Description Only:** Any Product meeting those standards or description.

1.4.2. **Products Specified by Naming One or More Manufacturers with or without Provision for Substitution:** Products of manufacturers named and meeting specifications with substitution of Products or manufacturer only when submitted under provisions of this section.

1.5. LIMITATIONS ON SUBSTITUTIONS

1.5.1. **Requests for substitution prior to bid or after bid, shall only be permitted as indicated in and in accordance with requirements specified in the Instructions to Bidders and the Special Conditions.**

1.5.2. The Bid shall be based upon the standards of quality established by those items of equipment and/or materials which are specifically identified in the Contract Documents.

1.5.3. Burden of proof of merit of requested substitution is the responsibility of the Contractor.

1.5.4. It is the sole responsibility of Contractor to submit the proper content of any requests for substitutions. Incomplete submittals will be rejected.

1.6. REGULATORY REQUIREMENTS

1.6.1. It shall be the responsibility of Contractor to obtain all regulatory approvals required for proposed substitutions.

1.6.2. All regulatory approvals shall be obtained for proposed substitutions prior to submittal of substitution request to Architect.

1.6.3. All costs incurred by the District in obtaining regulatory approvals for proposed substitutions to include the costs of the Architect and any authority having jurisdiction over the Project shall be reimbursed to the District. Costs of these services shall be reimbursed regardless of final acceptance or rejection of substitution.

1.6.4. Substitutions of materials or work procedures which affect the health, safety and welfare of the public shall have prior approval of the Division of the State Architect (DSA) field representative.

1.7. SUBSTITUTION REPRESENTATION

- 1.7.1. In submitting a request for substitution, Contractor makes the representation that:
- 1.7.2. Contractor has investigated the proposed substitution and determined that it meets or exceeds the quality level of the specified product;
- 1.7.3. Contractor has determined that all components of the proposed substitution are identical and fully interchangeable with the product name and number specified;
- 1.7.4. Contractor will provide the same warranty or guarantee for the substitution as for the specified product;
- 1.7.5. Contractor will coordinate installation and make changes to other work which may be required for the work to be completed with no additional cost to the District;
- 1.7.6. Contractor waives claims for additional cost or time extension which may subsequently become apparent; and
- 1.7.7. Contractor will reimburse District for the cost of District's and Architect's review or redesign services associated with substitution request.

1.8. SUBMITTAL PROCEDURE

- 1.8.1. Submit one (1) electronic copy of each request.
- 1.8.2. Submit request using District's Substitution Request Form as indicated in Contract Forms and Submittals. Substitution requests that are not on District's required form shall be returned without review.
- 1.8.3. Limit each request to one proposed substitution.
- 1.8.4. Request to include sufficient data so that direct comparison of proposed substitution can be made.
- 1.8.5. Provide complete documentation for each request. Documentation shall include the following information, as appropriate, as a minimum:
 - 1.8.5.1. Statement of cause for substitution request.
 - 1.8.5.2. Identify product by specification section and article number.
 - 1.8.5.3. Provide manufacturer's name, address, and phone number. List fabricators, suppliers, and installers as appropriate.
 - 1.8.5.4. List similar projects where proposed substitution has been used, dates of installation and names of Architect and District.
 - 1.8.5.5. List availability of maintenance services and replacement materials.
 - 1.8.5.6. Documented or confirmation of regulatory approval.

- 1.8.5.7. Product data, including drawings and descriptions of products.
- 1.8.5.8. Fabrication and installation procedures.
- 1.8.5.9. Samples of proposed substitutions.
- 1.8.5.10. Itemized comparison of significant qualities of the proposed substitution with those of the product specified. Significant qualities may include size, weight, durability, performance requirements and visual effects.
- 1.8.5.11. Coordination information, including a list of changes or modifications needed to other items of work that will become necessary to accommodate proposed substitution.
- 1.8.5.12. Statement on the substitutions effect on the Construction Schedule.
- 1.8.5.13. Cost information including a proposal of the net reduction in cost to the Contract Price if the proposed substitution is accepted.
- 1.8.5.14. Certification that the substitution is equal to or better in every respect to that required by the Contract Documents and that substitution will perform adequately in the application intended.
- 1.8.5.15. Waiver of right to additional payment or time that may subsequently become necessary because of failure of substitution to perform adequately.
- 1.8.6. Inadequate warranty, vagueness of submittal, failure to meet specified requirements, or submittal of insufficient data will be cause for rejection of substitution request.

1.9. DISTRICT'S REVIEW

- 1.9.1. The District will accept or reject proposed substitution within a reasonable amount of time.
- 1.9.2. If a request is made prior to bid opening and the District has not completed its review, Contractor shall base its bid on the product specified only.
- 1.9.3. There shall be no claim for additional time for review of proposed substitutions.
- 1.9.4. Final acceptance of a substitution submitted prior to the date established for the receipt of bids will be in the form of an addendum.

END OF DOCUMENT

DOCUMENT 01 26 00

CONTRACT MODIFICATION PROCEDURES

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Allowances;
- 1.1.5. Product Options and Substitutions; and
- 1.1.6. Project Coordination.

1.2. DESCRIPTION

- 1.2.1. This Document contains procedures to be followed by the Contractor to request changes in the Contract Time of the Contract Price.
- 1.2.2. **IF THERE IS ANY INCONSISTENCY IN THIS DOCUMENT WITH THE PROVISIONS IN THE GENERAL CONDITIONS AND THE SPECIAL CONDITIONS THAT THE CONTRACTOR SHALL COMPLY WITH RELATED TO CHANGES AND/OR REQUESTS FOR CHANGES (e.g., "Change in the Work"), THOSE PROVISIONS IN THE GENERAL CONDITIONS AND THE SPECIAL CONDITIONS SHALL TAKE PRECEDENCE.**

1.3. SUMMARY

This Document specifies administrative and procedural requirements for handling and processing Contract modifications.

1.4. CONSTRUCTION CHANGE DIRECTIVE

The District may, as provided by law, by Construction Change Directive and without invalidating the Contract, order changes in the Work consisting of additions, deletions, or other revisions.

1.5. PRICE REQUESTS

- 1.5.1. Do not consider Price Requests to be instructions either to stop work in progress or to execute the proposed change.
- 1.5.2. Within time specified in Price Request after receipt of Price Request, submit a quotation estimating cost adjustments to the Contract Price and the Contract Time necessary to execute the change.

- 1.5.2.1. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
- 1.5.2.2. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
- 1.5.2.3. Include costs of labor and supervision directly attributable to the change.
- 1.5.2.4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.6. PROPOSED CHANGE ORDERS

Contractor may propose changes by submitting a request for a change on District's Proposed Change Order form (PCO) to District.

- 1.6.1. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- 1.6.2. Comply with Contract Document requirements if the proposed change requires substitution of one product or system for product or system specified.

END OF DOCUMENT

DOCUMENT 01 26 10

REQUESTS FOR INFORMATION

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Documentation Requirements;
- 1.1.5. Electronic Data Transfer;
- 1.1.6. Submittals;
- 1.1.7. Contract Closeout and Final Cleaning;
- 1.1.8. Operation and Maintenance Data;
- 1.1.9. Warranties; and
- 1.1.10. Record Documents;

1.2. DESCRIPTION

This Document contains procedures to be followed by the Contractor to request Architect provide additional information necessary to clarify or amplify an item in the Contract Documents that Contractor thinks is not clearly shown or called for in the Drawings or Specifications or other portions of the Contract Documents, or to address issues that have arisen under field conditions.

1.3. PROCEDURES

- 1.3.1. Notification by Contractor:
 - 1.3.1.1. Submit all requirements for clarification or additional information, whether originated by the Contractor, a Subcontractor, or supplier at any tier, in writing to District as required by the Contract Documents.
 - 1.3.1.2. Number RFIs sequentially. Follow RFI number with sequential alphabetical suffix as necessary for each resubmission. For example, the first RFI would be "001." The second RFI would be "002."
 - 1.3.1.3. All RFIs shall reference all applicable Contract Document(s), including Specification section(s), detail(s), page number(s), drawing number(s), and sheet number(s), etc. Contractor shall make suggestions and interpretations of

the issue raised by each RFI. An RFI cannot modify the Contract Price, Contract Time, or the Contract Documents.

1.3.1.4. Limit each RFI to one subject.

1.3.1.5. Submit a RFI if one of the following conditions occurs:

1.3.1.5.1. Contractor discovers an unforeseen condition or circumstance that is not described in the Contract Documents.

1.3.1.5.2. Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents.

1.3.2. Contractor shall not:

1.3.2.1. Submit an RFI as a request for substitution.

1.3.2.2. Submit an RFI as a submittal.

1.3.2.3. Submit an RFI without first having thoroughly reviewed the Contract Documents.

1.3.2.4. Submit an RFI in a manner that suggests that specific portions of the Contract Documents are assumed to be excluded or by taking an isolated portion of the Contract Documents in part rather than whole.

1.3.2.5. Submit an RFI in an untimely manner without proper coordination and scheduling of Work related trades.

1.3.2.6. If Contractor submits an RFI contrary to the above, Contractor shall pay the cost of any review, which cost shall be deducted from the Contract Price.

1.3.3. Contractor shall be liable to the District for all costs incurred by the District associated with the processing, reviewing, evaluating and responding to any RFI, including without limitation, fees of the Architect and any other design consultant to the Architect or the District, that District reasonably determines:

1.3.3.1. Does not reflect adequate or competent supervision or coordination by the Contractor or any Subcontractor; or

1.3.3.2. Does not reflect the Contractor's adequate or competent knowledge of the requirements of the Work or the Contract Documents;

1.3.3.3. Requests an interpretation or decision of a matter where the information sought is equally available to the Contractor; or

1.3.3.4. Is not justified for any other reason.

1.4. RESPONSE TIME

- 1.4.1. Architect shall review RFIs and issue a response and instructions to Contractor within a reasonable time frame from the date the RFI is received and dated by the District.
- 1.4.2. Responses from the District will not change any requirement of the Contract unless so noted by the District in the response to the RFI. Should the Contractor contend that a response to an RFI causes a change to the Contract that requires a Change Order, the Contractor shall, before proceeding, give written notice to the District, indicating that the Contractor considers the District's response to the RFI to be a Change Order, as required by the Contract Documents.
- 1.4.3. Should Contractor direct its Subcontractors to proceed with the Work affected before receipt of a response from Architect, any portion of the Work which is not done in accordance with the Architect's ultimate interpretations, clarifications, instructions, or decisions is subject to removal or replacement at Contractor's sole expense and responsibility.

END OF DOCUMENT

DOCUMENT 01 31 00

COORDINATION AND PROJECT MEETINGS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS:

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any); and
- 1.1.4. Technical Specifications.

1.2. SECTION INCLUDES

- 1.2.1. Coordination Responsibilities of the Contractor.
- 1.2.2. Field Engineering Responsibilities of the Contractor.
- 1.2.3. Preconstruction Conference.
- 1.2.4. Progress Meetings.
- 1.2.5. Pre-Installation Conferences.
- 1.2.6. Post Construction Dedication.

1.3. COORDINATION RESPONSIBILITIES OF THE CONTRACTOR

- 1.3.1. Coordinate scheduling, submittals, and Work of the Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- 1.3.2. Prior to commencement of a particular type or kind of Work examine relevant information, contract documents, and subsequent data issued to the Project.
- 1.3.3. Verify that utility requirement 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.
- 1.3.4. Closing up of holes, backfilling, and other covering up operations shall not proceed until all enclosed or covered Work and inspections have been completed. Verify before proceeding.
- 1.3.5. Coordinate space requirements 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 line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- 1.3.6. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- 1.3.7. In locations where several elements of mechanical and electrical Work must be sequenced and positioned with precision in order to fit into available space, prepare coordination drawings showing the actual conditions required for the installation. Prepare coordination drawings prior to purchasing, fabricating, or installing any of the elements required to be coordinated.
- 1.3.8. Closing up of walls, partitions or furred spaces, backfilling, and other covering up operations shall not proceed until all enclosed or covered Work and inspections have been completed. Verify before proceeding.
- 1.3.9. Coordinate completion and cleanup of Work of separate sections in preparation for completion and for portions of Work designated for District's occupancy.
- 1.3.10. After District occupancy of Project, coordinate access to Site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of District's activities.
- 1.3.11. Coordinate all utility company Work in accordance with the Contract Documents.
- 1.3.12. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.4. FIELD ENGINEERING RESPONSIBILITIES OF THE CONTRACTOR

- 1.4.1. Contractor shall employ a Land Surveyor registered in the State of California and acceptable to the Architect.
- 1.4.2. Control datum for survey is that established by District provided survey. Contractor to locate and protect survey control and reference points.
- 1.4.3. Replace dislocated survey control points based on original survey control.
- 1.4.4. Provide field engineering services. Establish elevations, lines, and levels utilizing recognized engineering survey practices.
- 1.4.5. Upon completion of Work, submit certificate signed by the Land Surveyor that elevations and locations of Work are in conformance with Contract Documents. Record deviations on Record Drawings.

1.5. PRECONSTRUCTION CONFERENCE

- 1.5.1. Construction Manager or Project Engineer will schedule a conference immediately after, and in no case more than fifteen (15) days after, receipt of fully executed Contract Documents prior to Project mobilization.
- 1.5.2. Mandatory Attendance: Construction Manager, Project Engineer, Project Inspector, Architect of Record, Contractor, Contractor's Project Manager, and Contractor's Job/Project Superintendent.
- 1.5.3. Optional Attendance: Architect's consultants, and utility company representatives.
- 1.5.4. Construction Manager shall preside at conference and the Project Architect shall prepare and record minutes and distribute copies.
- 1.5.5. Agenda:
 - 1.5.5.1. Execution of Owner-Contractor Agreement.
 - 1.5.5.2. Issue Notice to Proceed.
 - 1.5.5.3. Submission of executed bonds and insurance certificates.
 - 1.5.5.4. Distribution of Contract Documents.
 - 1.5.5.5. Submission of list of Subcontractors, list of Products, Schedule of Values, and Progress Schedule.
 - 1.5.5.6. Designation of responsible personnel representing the parties.
 - 1.5.5.7. Procedures for processing Change Orders.
 - 1.5.5.8. Procedures for Request for Information.
 - 1.5.5.9. Procedures for testing and inspecting.
 - 1.5.5.10. Procedures for processing applications for payment.
 - 1.5.5.11. Procedures for Project closeout.
 - 1.5.5.12. Use of Premises.
 - 1.5.5.13. Work restrictions.
 - 1.5.5.14. District's occupancy requirements or options.
 - 1.5.5.15. Responsibility for temporary facilities and controls.
 - 1.5.5.16. Construction waste management and recycling.
 - 1.5.5.17. Parking availability.

- 1.5.5.18. Office, work and storage areas.
- 1.5.5.19. Equipment deliveries and priority.
- 1.5.5.20. Security.
- 1.5.5.21. Progress cleaning.
- 1.5.5.22. Review required submittals and (if applicable) LEED Certification requirements.

1.6. PROGRESS MEETINGS

- 1.6.1. Construction Manager shall schedule and administer meetings throughout progress of the Work at a minimum of every week.
- 1.6.2. Construction Manager or Project Engineer will make arrangements for meetings, prepare agenda, and preside at meetings. Project Architect shall record minutes (Field Reports), and distribute copies.
- 1.6.3. Attendance Required: Job Superintendent, Construction Manager, Project Engineer, Project Inspector, Architect of Record, Subcontractors, and suppliers as appropriate to agenda topics for each meeting.
- 1.6.4. Agenda:
 - 1.6.4.1. Review minutes of previous meetings (Field Reports).
 - 1.6.4.2. Review of Work progress.
 - 1.6.4.3. Field observations, problems, and decisions.
 - 1.6.4.4. Identification of problems which impede planned progress.
 - 1.6.4.5. Review of submittals schedule and status of submittals.
 - 1.6.4.6. Review of off-site fabrication and delivery schedules.
 - 1.6.4.7. Maintenance of construction schedule.
 - 1.6.4.8. Corrective measures to regain projected schedules.
 - 1.6.4.9. Planned progress during succeeding work period.
 - 1.6.4.10. Coordination of projected progress.
 - 1.6.4.11. Maintenance of quality and work standards.
 - 1.6.4.12. Effect of proposed changes on progress schedule and coordination.
 - 1.6.4.13. Other business relating to Work.
- 1.6.5. District has authority to schedule mandatory meetings other than those listed, as

necessary.

1.7. PRE-INSTALLATION CONFERENCES

- 1.7.1. When required in individual specification section, Contractor shall convene a pre-installation conference prior to commencing Work of the section. Refer to individual specification section for timing requirements of conference.
- 1.7.2. Contractor shall require its Subcontractors and suppliers directly affecting, or affected by, Work of the specific section to attend.
- 1.7.3. Notify the Construction Manager, Project Engineer, Project Inspector, and Architect of Record four (4) days in advance of meeting date.
- 1.7.4. A pre-installation conference may coincide with a regularly scheduled progress meeting.
- 1.7.5. Contractor shall prepare agenda, preside at conference, record minutes, and distribute copies within two (2) days after conference to participants.
- 1.7.6. The purpose of the meeting will be to review Contract Documents, conditions of installation, preparation and installation procedures, and coordination with related Work and manufacturer's recommendations.
- 1.7.7. Pre-installation Schedule: As a minimum, Work being installed under the Contract Documents technical sections will require pre-installation conferences. Contractor shall review the technical specifications and add all additional requirements for pre-installation meetings contained in those sections.

END OF DOCUMENT

DOCUMENT 01 32 16

CONSTRUCTION SCHEDULE – NETWORK ANALYSIS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISION

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Coordination and Meetings; and
- 1.1.5. Submittals.

1.2. REFERENCES

- 1.2.1. Construction Planning and Scheduling Manual - A Manual for General Contractors and the Construction Industry, The Associated General Contractors of America (AGC).
- 1.2.2. CSI - Construction Specifications Institute MP-2-1 Master Format.
- 1.2.3. U.S. National Weather Service - Local Climatological Data.

1.3. PERFORMANCE REQUIREMENTS

- 1.3.1. Ensure adequate scheduling during construction activities so Work may be prosecuted in an orderly and expeditious manner within stipulated Contract Time.
- 1.3.2. Ensure coordination of Contractor and Subcontractors at all levels.
- 1.3.3. Ensure coordination of submittals, fabrication, delivery, erection, installation, and testing of products, materials and equipment.
- 1.3.4. Ensure on-time delivery of District furnished products, materials and equipment.
- 1.3.5. Ensure coordination of jurisdictional reviews.
- 1.3.6. Prepare applications for payment.
- 1.3.7. Monitor progress of Work.
- 1.3.8. Prepare proper requests for changes to Contract Time.
- 1.3.9. Prepare proper requests for changes to Construction Schedule.
- 1.3.10. Assist in detection of schedule delays and identification of corrective actions.

1.4. QUALITY ASSURANCE

- 1.4.1. Perform scheduling work in accordance with Construction Planning and Scheduling Manual published by the AGC.
- 1.4.2. Maintain one copy of Construction Planning and Scheduling Manual on Site.
- 1.4.3. In the event of discrepancy between the AGC publication and the Contract Documents, provisions of the Contract Documents shall govern.

1.5. QUALIFICATIONS

1.5.1. Scheduler:

- 1.5.1.1. Contractor shall retain a construction scheduler to work in enough capacity to perform all of the Contractor's requirements to prepare the Construction Schedule. The Scheduler shall plan, coordinate, execute, and monitor a cost/resource loaded CPM schedule as required for Project and have a minimum of five (5) years direct experience using Primavera Project Management.
- 1.5.1.2. Scheduler will cooperate with District and shall be available on site for monitoring, maintaining and updating schedules in a timely manner.
- 1.5.1.3. District has the right to reject the Scheduler based upon a lack of experience as required by this Document or based on lack of performance and timeliness of schedule submittals/fragnets on past projects. Contractor shall within seven (7) calendar days of District's rejection, propose another scheduler who meets the experience requirements stated above.

- 1.5.2. **Administrative Personnel:** Five (5) years minimum experience in using and monitoring schedules on comparable projects.

1.6. SUBMITTALS

- 1.6.1. Submit Short Interval Schedule at each Construction Progress Meeting.
- 1.6.2. Submit Time Adjustment Schedule within five (5) days of commencement of a claimed delay.
- 1.6.3. Submit Recovery Schedules as required for timely completion of Work or when demanded by the District.
- 1.6.4. Submit job cost reports when demanded by the District.
- 1.6.5. Submit one (1) reproducible and two (2) copies of each schedule and cost report.
- 1.6.6. Submit large format plotted schedules monthly or at the request of the District or Construction Manager.

1.7. REVIEW AND EVALUATION

- 1.7.1. Contractor shall participate in joint review of Construction Schedule and Reports with District and Architect.
- 1.7.2. Within seven (7) days of receipt of District and/or Architect's comments provide satisfactory revision to Construction Schedule or adequate justification for activities in question.
- 1.7.3. In the event that an activity or element of Work is not detected by District or Architect review, such omission or error shall be corrected by next scheduled update and shall not affect Contract Time.
- 1.7.4. Acceptance by District of corrected Construction Schedule shall be a condition precedent to making any progress payments.
- 1.7.5. Cost-loaded values of Construction Schedule shall be basis for determining progress payments.
- 1.7.6. Review and acceptance by District and Architect of Preliminary Construction Schedule or Construction Schedule does not constitute responsibility whatsoever for accuracy or feasibility of schedules nor does such acceptance expressly or impliedly warrant, acknowledge or admit reasonableness of activities, logic, duration, manpower, cost or equipment loading stated or implied on schedules.

1.8. FORMAT

- 1.8.1. Prepare diagrams and supporting mathematical analyses using Precedence Diagramming Method, under concepts and methods outlined in AGC Construction Planning and Scheduling Manual, or other method pre-approved by District.
- 1.8.2. **Listings:** Reading from left to right, in ascending order for each activity.
- 1.8.3. **Diagram Size:** 42 inches maximum height x width required.
- 1.8.4. **Scale and Spacing:** To allow for legible notations and revisions.
- 1.8.5. Illustrate order and interdependence of activities and sequence of Work.
- 1.8.6. Illustrate complete sequence of construction by activity.
- 1.8.7. Provide legend of symbols and abbreviations used.

1.9. COST AND SCHEDULE REPORTS

- 1.9.1. **Activity Analysis:** Tabulate each activity of network diagram and identify for each activity:
 - 1.9.1.1. Description.
 - 1.9.1.2. Interface with outside contractors or agencies.

- 1.9.1.3. Number.
- 1.9.1.4. Preceding and following number.
- 1.9.1.5. Duration.
- 1.9.1.6. Earliest start date.
- 1.9.1.7. Earliest finish date.
- 1.9.1.8. Actual start date.
- 1.9.1.9. Actual finish date.
- 1.9.1.10. Latest start date.
- 1.9.1.11. Latest finish date.
- 1.9.1.12. Total and free float.
- 1.9.1.13. Identification of critical path activity.
- 1.9.1.14. Monetary value keyed to Schedule of Values.
- 1.9.1.15. Manpower requirements.
- 1.9.1.16. Responsibility.
- 1.9.1.17. Percentage complete.
- 1.9.1.18. Variance positive or negative.

1.9.2. **Cost Report:** Tabulate each activity of network diagram and identify for each activity:

- 1.9.2.1. Description.
- 1.9.2.2. Number.
- 1.9.2.3. Total cost.
- 1.9.2.4. Percentage complete.
- 1.9.2.5. Value prior to current period.
- 1.9.2.6. Value this period.
- 1.9.2.7. Value to date.

1.9.3. **Required Sorts:** List activities in sorts or groups:

- 1.9.3.1. By activity number.

- 1.9.3.2. By amount of float time in order of early start.
 - 1.9.3.3. By responsibility in order of earliest start date.
 - 1.9.3.4. In order of latest start dates.
 - 1.9.3.5. In order of latest finish dates.
 - 1.9.3.6. Application for payment sorted by Schedule of Values.
 - 1.9.3.7. Listing of activities on critical path.
- 1.9.4. Listing of basic input data which generates schedule.

1.10. CONSTRUCTION SCHEDULE

- 1.10.1. Contractor shall develop and submit a cost loaded preliminary schedule of construction (or Preliminary Construction Schedule) as required by this Document and the Contract Documents. It shall be submitted in computer generated network format and shall be organized by Activity Codes representing the intended sequencing of the Work, and with time scaled network diagrams of activities. The Preliminary Construction Schedule shall include activities such as mobilization, preparation of submittals, specified review periods, procurement items, fabrication items, milestones, and all detailed construction activities.
- 1.10.2. Upon District's acceptance of the Preliminary Construction Schedule, Contractor shall update the accepted Preliminary Construction Schedule until Contractor's Construction Schedule is fully developed and accepted. Since updates to the Construction Schedule are the basis for payment to Contractor, submittal and acceptance of the Construction Schedule and updates shall be a condition precedent to making of monthly payments, as indicated in the General Conditions.
- 1.10.3. Failure to submit an adequate or accurate Preliminary Construction Schedule, Construction Schedule, updates thereto or failure to submit on established dates, will be considered a breach of Contract.
- 1.10.4. Failure to include any activity shall not be an excuse for completing all Work by required Completion Date.
- 1.10.5. Activities of long intervals shall be broken into increments no longer than fourteen (14) days or a value over \$20,000.00, unless approved by the District or it is a non-construction activity for procurement and delivery.
- 1.10.6. The Construction Schedule shall comply with the following and include the following:
 - 1.10.6.1. Provide a written narrative describing Contractor's approach to mobilization, procurement, and construction during the first thirty (30) calendar days including crew sizes, equipment and material delivery, Site access, submittals, and permits.
 - 1.10.6.2. Shall designate critical path or paths.

- 1.10.6.3. Procurement activities to include mobilization, shop drawings and sample submittals.
 - 1.10.6.4. Identification of key and long-lead elements and realistic delivery dates.
 - 1.10.6.5. Construction activities in units of whole days limited to fourteen (14) days for each activity except non-construction activities for procurement and delivery.
 - 1.10.6.6. Approximate cost and duration of each activity.
 - 1.10.6.7. Shall contain seasonal weather considerations.
 - 1.10.6.8. Indicate a date for Project Completion that is no later than Completion Date subject to any time extensions processed as part of a Change Order.
 - 1.10.6.9. Conform to mandatory dates specified in the Contract Documents.
 - 1.10.6.10. Contractor shall allow for inclement weather in the Proposed Baseline Schedule by incorporating an activity titled "Rain Day Impact Allowance" as the last activity prior to the Completion Milestone. No other activities may be concurrent with it. The duration of the Rain Day Impact Allowance activity will be in accordance with the Special Conditions, and will be calculated from the Notice to Proceed until the Completion.
 - 1.10.6.11. Level of detail shall correspond to complexity of work involved.
 - 1.10.6.12. Indicate procurement activities, delivery, and installation of District furnished material and equipment.
 - 1.10.6.13. Designate critical path or paths.
 - 1.10.6.14. Subcontractor work at all levels shall be included in schedule.
 - 1.10.6.15. As developed, shall show sequence and interdependence of activities required for complete performance of Work.
 - 1.10.6.16. Shall be logical and show a coordinated plan of Work.
 - 1.10.6.17. Show order of activities and major points of interface, including specific dates of completion.
 - 1.10.6.18. Duration of activities shall be coordinated with Subcontractors and suppliers and shall be best estimate of time required.
 - 1.10.6.19. Shall show description, duration and float for each activity.
- 1.10.7. **Activity.** An activity shall meet the following criteria:
- 1.10.7.1. Any portion or element of Work, action, or reaction that is precisely described, readily identifiable, and is a function of a logical sequential process.

- 1.10.7.2. Descriptions shall be clear and concise. Beginning and end shall be readily verifiable. Starts and finishes shall be scheduled by logical restraints.
- 1.10.7.3. Responsibility shall be identified with a single performing entity.
- 1.10.7.4. Additional codes shall identify building, floor, bid opening and/or District's receipt of proposals, whichever is acceptable and CSI classification.
- 1.10.7.5. Assigned dollar value (cost-loading) of each activity shall cumulatively equal total contract amount. Mobilization, bond and insurance costs shall be separate. General requirement costs, overhead, profit, shall be prorated throughout all activities. Activity costs shall correlate with Schedule of Values.
- 1.10.7.6. Each activity shall have manpower-loading assigned.
- 1.10.7.7. Major construction equipment shall be assigned to each activity.
- 1.10.7.8. Activities labeled start, continue or completion are not allowed.
- 1.10.8. **Equipment and Materials.** For major equipment and materials show a sequence of activities including:
 - 1.10.8.1. Preparation of shop drawings and sample submissions.
 - 1.10.8.2. Review of shop drawings and samples.
 - 1.10.8.3. Finish and color selection.
 - 1.10.8.4. Fabrication and delivery.
 - 1.10.8.5. Erection or installation.
 - 1.10.8.6. Testing.
- 1.10.9. Include a minimum of fifteen (15) days prior to Completion Date for punch lists and clean up. No other activities shall be scheduled during this period.

1.11. SHORT INTERVAL SCHEDULE

- 1.11.1. The Four-Week Rolling Schedule shall be based on the most recent District Accepted Construction Schedule or Update. It shall include weekly updates to all construction, submittal, fabrication/procurement, and separate Work Contract activities. Contractor shall ensure that it accurately reflects the current progress of the Work.
- 1.11.2. Shall be fully developed horizontal bar-chart-type schedule directly derived from Construction Schedule.
- 1.11.3. Prepare schedule on sheet of sufficient width to clearly show data.
- 1.11.4. Provide continuous heavy vertical line identifying first day of week.

- 1.11.5. Provide continuous subordinate vertical line identifying each day of week.
- 1.11.6. Identify activities by same activity number and description as Construction Schedule.
- 1.11.7. Show each activity in proper sequence.
- 1.11.8. Indicate graphically sequences necessary for related activities.
- 1.11.9. Indicate activities completed or in progress for previous two (2) week period.
- 1.11.10. Indicate activities scheduled for succeeding three (3) week period.
- 1.11.11. Further detail should be added if necessary to monitor schedule or if requested by District.

1.12. REQUESTED TIME ADJUSTMENT SCHEDULE

- 1.12.1. Updated Construction Schedule shall not show a Completion Date later than the Contract Time, subject to any time extensions processed as part of a Change Order.
- 1.12.2. If an extension of time is requested, a separate schedule entitled "Requested Time Adjustment Schedule" shall be submitted to District and Architect.
- 1.12.3. Indicate requested adjustments in Contract Time which are due to changes or delays in completion of Work.
- 1.12.4. Extension request shall include forecast of Project Completion date and actual achievement of any dates listed in Contract Documents.
- 1.12.5. To the extent that any requests are pending at time of any Construction Schedule update, Time Adjustment Schedule shall also be updated.
- 1.12.6. Schedule shall be a time-scaled network analysis.
- 1.12.7. Accompany schedule with formal written time extension request and detailed impact analysis justifying extension.
- 1.12.8. Time impact analysis shall demonstrate time impact based upon date of delay, and status of construction at that time and event time computation of all affected activities. Event times shall be those as shown in latest Construction Schedule.
- 1.12.9. Activity delays shall not automatically constitute an extension of Contract Time.
- 1.12.10. Failure of Subcontractors shall not be justification for an extension of time.
- 1.12.11. Float is not for the exclusive use or benefit of any single party. Float time shall be apportioned according to needs of Project, as determined by the District.
- 1.12.12. Float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity durations, or imposed dates shall be apportioned according to benefit of Project.

- 1.12.13. Extensions will be granted only to extent that time adjustments to activities exceed total positive float of the critical path and extends Completion date.
- 1.12.14. District shall not have an obligation to consider any time extension request unless requirements of Contract Documents, and specifically, but not limited to these requirements, are complied with.
- 1.12.15. District shall not be responsible or liable for any construction acceleration due to failure of District to grant time extensions under Contract Documents should requested adjustments in Contract Time not substantially comply with submission and justification requirements of Contract for time extension requests.
- 1.12.16. In the event a Requested Time Adjustment Schedule and Time Impact Analysis are not submitted within ten (10) days after commencement of a delay it is mutually agreed that delay does not require a Contract Time extension.

1.13. RECOVERY SCHEDULE

- 1.13.1. When activities are behind Construction Schedule a supplementary Recovery Schedule shall be submitted.
- 1.13.2. Contractor shall prepare and submit to the District a Recovery Schedule whenever activities are behind Construction Schedule or at any time requested by the District, at no cost to the District.
- 1.13.3. Form and detail shall be sufficient to explain and display how activities will be rescheduled to regain compliance with Construction Schedule and to complete the Work by the Completion Date.
- 1.13.4. Maximum duration shall be one (1) month and shall coincide with payment period.
- 1.13.5. Ten (10) days prior to expiration of Recovery Schedule, Contractor shall have to show verification to determine if activities have regained compliance with Construction Schedule. Based upon this verification the following will occur:
 - 1.13.5.1. Supplemental Recovery Schedule will be submitted to address subsequent payment period.
 - 1.13.5.2. Construction Schedule will be resumed.

1.14. UPDATING SCHEDULES

- 1.14.1. Review and update schedules at least ten (10) days prior to submitting an Application for Payment.
- 1.14.2. Maintain schedules to record actual prosecution and progress.
- 1.14.3. Approved Change Orders which affect schedules shall be identified as separate new activities.
- 1.14.4. Change Orders of less than \$5,000.00 value or less than three (3) days duration need not be shown unless critical path is affected.

- 1.14.5. No other revisions shall be made to schedules unless authorized by District.
- 1.14.6. **Schedule Narrative Report:** Contractor shall include a written report to explain the Monthly Schedule Update. The narrative shall, at a minimum, include the following headings with appropriate discussions of each topic:
 - 1.14.6.1. Activities or portions of activities completed during previous reporting period.
 - 1.14.6.2. Actual start dates for activities currently in progress.
 - 1.14.6.3. Deviations from critical path in days ahead or behind.
 - 1.14.6.4. List of major construction equipment used during reporting period and any equipment idle.
 - 1.14.6.5. Number of personnel by trade engaged on Work during reporting period.
 - 1.14.6.6. Progress analysis describing problem areas.
 - 1.14.6.7. Current and anticipated delay factors and their impact.
 - 1.14.6.8. Proposed corrective actions and logic revisions for Recovery Schedule.
 - 1.14.6.9. Proposed modifications, additions, deletions and changes in logic of Construction Schedule.
 - 1.14.6.10. In updating the Schedule, Contractor shall not modify Activity ID numbers, schedule calculation rules/criteria, or the Activity Coding Structure required.
- 1.14.7. Schedule update will form basis upon which progress payments will be made.
- 1.14.8. District will not be obligated to review or process Application for Payment until the Construction Schedule and Schedule Narrative Report have been submitted.

1.15. DISTRIBUTION

- 1.15.1. Following joint review and acceptance of updated schedules distribute copies to District, Architect, and all other concerned parties.
- 1.15.2. Instruct recipients to promptly report in writing any problem anticipated by projections shown in schedules.

2. PRODUCTS

2.1. SCHEDULING SOFTWARE

Contractor shall utilize District-approved software and shall employ the Critical Path Method (CPM) in the development and maintenance of the Construction Schedule. The scheduling software shall be capable of being resource loaded with manpower, costs and materials. It shall also be capable of generating time-scaled logic diagrams, resource histograms and profiles, bar charts, layouts and reports with any and/or all activity detail.

2.2. ELECTRONIC DATA

Provide compact disk(s) that contain a back-up of the Proposed Baseline Schedule data on it and in a format approved by the District.

END OF DOCUMENT

DOCUMENT 01 33 00

SUBMITTALS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISION

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions;
- 1.1.3. Instructions to Bidders;
- 1.1.4. Summary of Work;
- 1.1.5. Contract Forms and Submittals;
- 1.1.6. Product Options and Substitutions;
- 1.1.7. Requests for Information;
- 1.1.8. Contract Closeout and Final Cleaning;
- 1.1.9. Operation and Maintenance Data;
- 1.1.10. Warranties;
- 1.1.11. Record Documents;
- 1.1.12. Demonstration and Training;

1.2. DOCUMENT INCLUDES

- 1.2.1. Submittal procedures – Use of Primavera.
- 1.2.2. Shop drawings.
- 1.2.3. PCM (or other pre-approved program) Electronic Submittal Process
- 1.2.4. Product data.
- 1.2.5. Samples.
- 1.2.6. Manufacturers' Instructions.
- 1.2.7. Manufacturers' Certificates.
- 1.2.8. Mock-Up.

1.2.9. Deferred approval requirements.

1.3. SUBMITTAL PROCEDURES – USE OF PRIMAVERA OR ANOTHER PRE-APPROVED PROGRAM

Contractor shall utilize District-approved software for the submittal process.

1.3.1. Contractor shall transmit each submittal in conformance with requirements of this Document. For each submittal, Contractor shall:

1.3.1.1. Sequentially number the transmittal forms. Resubmitted submittals must have the original number with an alphabetic suffix;

1.3.1.2. Identify Project and Architect's project number, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate;

1.3.1.3. Apply Contractor's stamp, signed or initialed certifying that review, 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. Submittals without Contractor's stamp and signature will be returned without review.

1.3.2. Coordinate preparation and processing of submittals with performance of Work. Transmit each submittal sufficiently in advance of performance of Work to avoid delay.

1.3.2.1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

1.3.2.2. Coordinate transmittal of different types of submittals for related parts of Work so processing will not be delayed because of the need to review submittals concurrently for coordination.

1.3.2.3. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

1.3.3. Comply with Contract Documents for list of submittals and time requirements for scheduled performance of Work.

1.3.4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

1.3.5. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

1.3.6. Provide space for Contractor and Architect review stamps.

1.3.7. Revise and resubmit submittals as required, identify all changes made since previous submittal.

1.3.8. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.3.9. Submittals not requested will not be recognized or processed. Submittals not requested

will be returned without review.

1.4. SHOP DRAWINGS

- 1.4.1. Prepare Project-specific information, drawn accurately to scale. Do not reproduce Contract Documents or copy standard information as the basis of shop drawings. Standard information prepared without specific reference to the Project is not a shop drawing.
- 1.4.2. Do not use or allow others to use Shop Drawings which have been submitted and have been rejected.
- 1.4.3. Preparation: Fully illustrate requirements in Contract Documents. Include the following information, as applicable:
 - 1.4.3.1. Dimensions.
 - 1.4.3.2. Identification of products.
 - 1.4.3.3. Fabrication and installation drawings.
 - 1.4.3.4. Roughing-in and setting diagrams.
 - 1.4.3.5. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - 1.4.3.6. Shop work manufacturing instructions.
 - 1.4.3.7. Templates and patterns.
 - 1.4.3.8. Schedules.
 - 1.4.3.9. Design calculations.
 - 1.4.3.10. Compliance with specified standards.
 - 1.4.3.11. Notation of coordination requirements.
 - 1.4.3.12. Notation of dimensions established by field measurements.
 - 1.4.3.13. Relationship to adjoining construction clearly indicated.
 - 1.4.3.14. Seal and signature of professional engineer if specified.
 - 1.4.3.15. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - 1.4.3.16. All deviations from the Contract Documents, clearly indicated.
 - 1.4.3.17. Copy of letter indicating acceptance of deviations indicated on the submittal.
- 1.4.4. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop

Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).

- 1.4.5. Do not use Shop Drawings without an appropriate final stamp from the Contractor and District indicating action taken in connection with construction.
- 1.4.6. Deviations from Contract Documents require specific written acceptance by the District of the noted deviation and clear indication on the submittal.

1.5. ELECTRONIC SUBMITTAL PROCESS

1.5.1. Submittal Procedure for Large Format Shop Drawings.

- 1.5.1.1. Contractor shall provide six (6) paper copies of the large format Shop Drawings directly to the District and the Construction Manager (CM) and Contractor will upload/post an electronic transmittal (with a detailed description of the submittal including the subject, specification number and number of drawings) on PCM (or other pre-approved program).
- 1.5.1.2. Contractor shall verify that the Schedule of Submittals and all submittal log(s) on PCM (or other pre-approved program) are accurate and up to date.
- 1.5.1.3. The District and Architect will review and markup each Submittal and provide changes to Contractor for Contractor's incorporation into the Submittal.
- 1.5.1.4. This process will continue until the Contractor has provided a Submittal that is acceptable to the District and the Architect.
- 1.5.1.5. Once a Submittal is accepted, the District will provide a final accepted Submittal to the Contractor and the Contractor will closeout that one Submittal.
- 1.5.1.6. Contractor shall send one (1) copy of the completed record submittal of the large format documents to a vendor (Ford Graphics is suggested) for scanning and posting on PCM (or other pre-approved program).

1.5.2. Product Data, Calculations and Small Format Drawings

- 1.5.2.1. Contractor shall upload/post one (1) electronic copy (from manufacturer's website or pre-scanned) of the product literature, data, calculations, and/or small format shop drawings to PCM (or other pre-approved program) with a Transmittal (with a detailed description of the submittal) directly to the CM.
- 1.5.2.2. The District and Architect will review and markup each Submittal and provide changes to Contractor for Contractor's incorporation into the Submittal.
- 1.5.2.3. This process will continue until the Contractor has provided a Submittal that is acceptable to the District and the Architect.
- 1.5.2.4. Once a Submittal is accepted, the District will provide a final accepted Submittal to the Contractor and the Contractor will closeout that one Submittal.

1.5.2.5. Contractor shall send one (1) copy of the completed record submittal of the large format documents to a vendor (Ford Graphics is suggested) for scanning and posting on PCM (or other pre-approved program).

1.5.3. Sample Submittal Procedure – (Product / Assembly Samples)

1.5.3.1. Contractor shall provide four (4) physical samples directly to the District and the CM and Contractor will upload/post an electronic transmittal (with a detailed description of the submittal including the subject, specification number and number of drawings) on PCM (or other pre-approved program).

1.5.3.2. The District and Architect will review and markup each Submittal and provide changes to Contractor for Contractor’s incorporation into the Submittal.

1.5.3.3. This process will continue until the Contractor has provided a Submittal that is acceptable to the District and the Architect.

1.5.3.4. Once a Submittal is accepted, the District will provide a final accepted Submittal to the Contractor and the Contractor will closeout that one Submittal.

1.5.3.5. Contractor shall send one (1) copy of the completed record submittal of the large format documents to a vendor (Ford Graphics is suggested) for scanning and posting on PCM (or other pre-approved program).

1.6. PRODUCT DATA

1.6.1. In addition to the above requirements, mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

1.6.2. After review, distribute in accordance with the above provisions and provide copies for Record Documents described in the Contract Documents.

1.7. SAMPLES

1.7.1. In addition to the above requirements, submit samples to illustrate functional and aesthetic characteristics of the Product in accordance with this Document, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1.7.2. Where specific colors or patterns are not indicated, provide materials and products specified in the full range of color, texture and pattern for selection by District. Range shall include standard stocked color/texture/pattern, standard color/texture/pattern not stocked, but available from manufacturer, and special color/ texture/pattern available from manufacturer as advertised in product data and brochures. Unless otherwise indicated in individual specification sections, District may select from any range at no additional cost to District.

1.7.3. Include identification on each sample, with full Project information.

1.7.4. Submit the number of samples that Contractor requires, plus one that will be retained

by Architect and one by District.

- 1.7.5. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.8. MANUFACTURERS' INSTRUCTIONS

- 1.8.1. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- 1.8.2. Identify conflicts between manufacturers' instructions and Contract Documents.

1.9. MANUFACTURERS' CERTIFICATES

- 1.9.1. When specified in individual specification Sections, submit manufacturers' certificates to Architect for review, in quantities specified for Product Data.
- 1.9.2. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- 1.9.3. Certificates may be recent or previous test results on material or Product, but must be acceptable to District.

1.10. MOCK-UP

- 1.10.1. Where indicated, provide mock-ups as required. Mock-ups shall be prepared per the specifications and shall accurately and reasonably represent the quality of construction the Contractor will provide. If the mock-up or portions thereof do not adequately represent the quality of the work specified, the Contractor shall modify the mock-up as needed.
- 1.10.2. Once completed to the District's satisfaction, the mock-up shall serve as the standard of quality for the work.
- 1.10.3. All mock-ups, at District's option, shall remain the property of the District. If not required by the District, Contractor shall remove and dispose of the mock-up.
- 1.10.4. Where indicated, on-site mock-ups, if accepted, may be integrated into the Work.

1.11. ARCHITECT'S REVIEW OF SUBMITTALS

- 1.11.1. Submittals will be reviewed and stamped by the Architect "No exceptions taken," "Submit specified item" or "Make corrections noted" to indicate full or conditioned approval or "Revise and resubmit" or "Rejected" to indicate disapproval. Terms are defined as follows:
 - 1.11.1.1. No Exceptions Taken: Accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. Does not constitute approval or deletion of specified or required items not shown in the partial submittal.

- 1.11.1.2. Submit specified item: Submit to the Architect the items indicated for review.
 - 1.11.1.3. Correct as noted: Same as 1., except that minor corrections as noted shall be made by the Contractor. No resubmittal required.
 - 1.11.1.4. Revise and resubmit: Rejected because of major inconsistencies or errors which shall be resolved or corrected by the Contractor prior to subsequent review by the Architect.
 - 1.11.1.5. Rejected: Submitted material does not conform to plans and specifications in major respect. For example, wrong size, model, capacity or material. Resubmit.
 - 1.11.1.6. Receipt Acknowledged. Received, recorded and distributed without further action.
- 1.11.2. Submittals reviewed by the Architect which have been stamped shall be deemed to have the following language affixed and made a part thereof, regardless of the initial or subsequent readability of the actual stamp.
- 1.11.2.1. Corrections or comments made on submittals during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is for review of general conformance with the design concept of the project and general compliance with information given in the Contract Documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selection of fabrication processes and techniques of construction, coordinating the work of the trades; and performing the work in a safe and satisfactory manner.
- 1.11.3. Architect's review of submittals shall be completed within ten working days of the date of submission. Any requests by Architect for additional time shall not be unreasonably withheld.
- 1.11.4. Architect's review of submittals has, as a primary objective, to assist in the completion of the project on time and in conformance with the Contract requirements by permitting review of material and fabricated items prior to ordering. Architect's review of submittals is based only on the data presented and extends only to conformance with general design intent and information contained in the Contract Documents.
- 1.11.5. Architect's approval of submittals does not constitute final acceptance or unqualified approval of items or work proposed or put in place, nor does it constitute acceptance of responsibility for the accuracy, coordination or completeness of submittals. Architect's approval of submittals does not relieve the Contractor from the responsibility for errors, omissions, or compliance with all the requirements of the Contract Documents.
- 1.11.6. Reimbursement of the Architect's costs for review:

- 1.11.6.1. Architect will record all time and expenses incurred to review submittals requiring more than two reviews.
- 1.11.6.2. Contractor shall reimburse the District through deduction from amounts due the Contractor upon receipt of the Architect's billing and that of the Architect's consultants at standard billing rates for all time and expenses incurred in unanticipated reviews.
- 1.11.7. Architect's review of submittals does not change the Contract in any manner.

1.12. RESUBMITTAL

- 1.12.1. Make all corrections or revisions required by reviewer's comments at Contractor's expense and resubmit as initially specified above. No additional costs will be authorized for corrections or revisions.
- 1.12.2. Product data and shop drawings:
 - 1.12.2.1. Revise initial drawings or data and resubmit as initially specified.
 - 1.12.2.2. Indicate changes which have been made other than those requested by reviewer.
- 1.12.3. Submit new samples as initially specified.

1.13. DISTRIBUTION

- 1.13.1. Distribute only submittals with Architect/Engineer (and DSA as applicable) stamps of review. Contractor is responsible for coordination of submittals and comments following review. Contractor to provide all additional reproduction costs for copies required by the Contractor at its expense. No additional costs will be authorized for Contractor costs pertaining to submittals.

1.14. DEFERRED APPROVAL REQUIREMENTS

- 1.14.1. Installation of deferred approval items shall not be started until detailed plans, specifications, and engineering calculations have been accepted and signed by the Architect or Engineer in general responsible charge of design and signed by a California registered Architect or professional engineer who has been delegated responsibility covering the work shown on a particular plan or specification and approved by the agency having authority (e.g., State Fire Marshall, Division of the State Architect, gas company, electrical utility company, water district, etc.). Deferred approval items for this Project are as indicated in the Summary of Work.
- 1.14.2. Unless otherwise indicated in the Contract Documents or if District provides written approval of a longer time period, Contractor shall submit all deferred approval items for approval within thirty (30) days of the notice to proceed with the Construction Phase.
- 1.14.3. Deferred approval drawings and specifications become part of the approved documents for the Project when they are submitted to and approved by DSA.
- 1.14.4. Submit material using electronic submittal process as defined above.

- 1.14.5. Identify and specify all supports, fasteners, spacing, penetrations, etc., for each of the deferred approval items, including calculations for each and all fasteners.
- 1.14.6. Submit documents to Architect for review prior to forwarding to DSA.
- 1.14.7. Documents shall bear the stamp and signature of the Structural, Mechanical, or Electrical Engineer licensed in the State of California who is responsible for the work shown on the documents.
- 1.14.8. Architect and its subconsultants will review the documents only for conformance with design concept shown on the documents. The Architect will then forward the Submittal to agency having authority for approval.
- 1.14.9. Contractor shall respond to review comments made by DSA and revise and resubmit submittal to the Architect for re-submittal to DSA.
- 1.14.10. Contractor is notified that significant lead time is required for deferred approval review by DSA and shall schedule work accordingly. No extension of Contract Time will be allowed for delays incurred by deferred approval review. The Architect is not responsible for DSA delays in deferred approval review.

END OF DOCUMENT

DOCUMENT 01 40 00

QUALITY REQUIREMENTS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Drawings;
- 1.1.5. Construction Schedule – Network Analysis;
- 1.1.6. General Definitions and References.

1.2. SUMMARY

- 1.2.1. This Document includes administrative and procedural requirements for quality assurance and quality control.
- 1.2.2. Testing and inspecting services by the District are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Documents' requirements.
 - 1.2.2.1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Specifications for those activities. Requirements in those Specifications may also cover production of standard products.
 - 1.2.2.2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Documents' requirements.
 - 1.2.2.3. Requirements for Contractor to provide quality-assurance and -control services required by District, District's consultants, or authorities having jurisdiction are not limited by provisions of this Document.

1.3. DEFINITIONS

- 1.3.1. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- 1.3.2. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by District or its consultants.

- 1.3.3. Mock-ups: Full-size, physical assemblies that are constructed on-site. Mock-ups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mock-ups establish the standard by which the Work will be judged.
- 1.3.4. Laboratory Mock-ups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- 1.3.5. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- 1.3.6. Product Testing: Tests and inspections that are performed by an NRTL (National Recognized Testing Laboratory), an NVLAP (National Voluntary Laboratory Accreditation Program), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- 1.3.7. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- 1.3.8. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

1.4. CONFLICTING REQUIREMENTS

- 1.4.1. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal, to District for a decision before proceeding.
- 1.4.2. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to District for a decision before proceeding.

1.5. SUBMITTALS

- 1.5.1. Qualification Data: For testing agencies specified in "Quality Assurance" below to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- 1.5.2. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1.5.2.1. Specification number and title.
 - 1.5.2.2. Description of test and inspection.
 - 1.5.2.3. Identification of applicable standards, codes or regulations.
 - 1.5.2.4. Identification of test and inspection methods.

- 1.5.2.5. Number of tests and inspections required.
- 1.5.2.6. Time schedule or time span for tests and inspections.
- 1.5.2.7. Entity responsible for performing tests and inspections.
- 1.5.2.8. Requirements for obtaining samples.
- 1.5.2.9. Unique characteristics of each quality-control service.
- 1.5.3. Reports: Prepare and submit certified written reports that include the following:
 - 1.5.3.1. Date of issue.
 - 1.5.3.2. Project title and number.
 - 1.5.3.3. Name, address, and telephone number of testing agency.
 - 1.5.3.4. Dates and locations of samples and tests or inspections.
 - 1.5.3.5. Names of individuals making tests and inspections.
 - 1.5.3.6. Description of the Work and test and inspection method.
 - 1.5.3.7. Identification of product and Specification.
 - 1.5.3.8. Complete test or inspection data.
 - 1.5.3.9. Test and inspection results and an interpretation of test results.
 - 1.5.3.10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 1.5.3.11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Documents' requirements.
 - 1.5.3.12. Name and signature of laboratory inspector.
 - 1.5.3.13. Recommendations on retesting and reinspecting.
 - 1.5.3.14. Descriptions of deficiencies noted, and corrective action undertaken to resolve such deficiencies.
 - 1.5.3.14.1. Deficiencies observed shall immediately be brought to the attention of the Contractor's field superintendent, and trade foreman. In the event deficiencies are not corrected, or if an interpretation of the Contract Documents is required, the Testing Agency shall immediately notify the District and applicable consultant, Architect, or Engineer.
 - 1.5.3.14.2. The Testing Agency shall maintain a deficiency list of all items not corrected and shall reinspect the area after the deficiency has been corrected. The list shall include a description of the deficiency, the date and time the deficiency was observed,

who was notified, the date of reinspection and description of any corrective action taken. Distribute the deficiency list at least once per month.

1.5.3.15.15. At the end of the Project, the Testing Agency shall submit a final signed report stating whether the work tested and inspected conforms to the Contract Documents' requirements.

1.5.4. Permits, Licenses, and Certificates: For District's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6. QUALITY ASSURANCE

1.6.1. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specifications specify additional requirements.

1.6.2. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance. Where required by the individual Specifications, Installer employing workers trained and approved by manufacturer, Installer being acceptable to manufacturer, and/or Installer being an authorized representative of manufacturer for both installation and maintenance.

1.6.3. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

1.6.4. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

1.6.5. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of California, and who is experienced in providing engineering services of the kind indicated.

1.6.6. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

1.6.7. Specialists: Certain Specifications may require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1.6.7.1. Requirement for specialists shall not supersede building codes or regulations governing the Work.

1.6.8. Testing Agency Qualifications: An NRTL, an NVLAP, Division of the State of Architect's Accepted Laboratory, or an independent agency with the experience and capability to conduct testing and inspecting indicated; and with additional qualifications stated in

individual Specifications; and where required by and acceptable to authorities having jurisdiction.

1.6.8.1. NRTL: A Nationally Recognized Testing Laboratory according to 29 CFR 1910.7.

1.6.8.2. NVLAP: A testing agency accredited according to NIST's (National Institute of Standards and Technology) National Voluntary Laboratory Accreditation Program.

1.6.8.3. Tests shall be made by an accredited testing agency with a minimum of 5 years of experience in the specific type of testing to be performed. Except as otherwise provided, sampling and testing of all materials and the laboratory methods and testing equipment shall be in accordance with the applicable standards and methods of the California Building Standards code.

1.6.8.4. For each type of inspection and testing service to be performed, the Testing Agency shall submit certification, signed and sealed by the Agency's professional engineer, of compliance with all applicable requirements of the following:

1.6.8.4.1. ASTM E329, "Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction."

1.6.8.4.2. "Recommended Requirements for Independent Laboratory Qualifications" published by the American Council of Independent Laboratories.

1.6.8.5. Furnish written certification to the District that all equipment to be used has been calibrated in accordance with applicable ASTM standards within the last year and is in proper working order.

1.6.8.6. Testing Agency Personnel Qualifications: Testing and inspection services shall be performed only by trained and experienced technicians currently qualified for the work they are to perform. Documentation of such training and experience shall be submitted to the District and/or its consultants upon request.

1.6.8.7. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

1.6.8.8. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.6.9. Preconstruction Testing: Where a testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1.6.9.1. Contractor responsibilities include the following:

1.6.9.1.1. Verify by its Quality Assurance/Quality Control procedures that an element is ready for testing prior to requesting a test.

- 1.6.9.1.2. Provide test specimens representative of proposed products and construction.
 - 1.6.9.1.3. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - 1.6.9.1.4. Provide sizes and configurations of test assemblies, mock-ups, and laboratory mock-ups to adequately demonstrate capability of products to comply with performance requirements.
 - 1.6.9.1.5. Build site-assembled test assemblies and mock-ups using installers who will perform same tasks for Project.
 - 1.6.9.1.6. Build laboratory mock-ups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - 1.6.9.1.7. When testing is complete, remove test specimens, assemblies, mock-ups, and laboratory mock-ups; do not reuse products on Project.
- 1.6.9.2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to District with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents' requirements.
- 1.6.10. Mock-ups: Before installing portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
- 1.6.10.1. Build mock-ups in location and of size indicated or, if not indicated, as directed by District or its consultant.
 - 1.6.10.2. Notify District and its consultants seven (7) days in advance of dates and times when mock-ups will be constructed.
 - 1.6.10.3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 1.6.10.4. Obtain District and its consultant's approval of mock-ups before starting work, fabrication, or construction.
 - 1.6.10.4.1. Allow seven (7) days for initial review and each re-review of each mock-up.
 - 1.6.10.5. Incorporate seismic design of nonstructural components into mock-ups.
 - 1.6.10.6. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 1.6.10.7. Demolish and remove mock-ups when directed, unless otherwise indicated.
- 1.6.11. Laboratory Mock-Ups: Comply with requirements of preconstruction testing and those specified in individual Specifications in Divisions 02 through 49.

1.7. QUALITY CONTROL

- 1.7.1. District Responsibilities: Where quality-control services are indicated as District's responsibility, District will engage a qualified testing agency to perform these services.
 - 1.7.1.1. District will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting the testing agencies are engaged to perform.
 - 1.7.1.2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Price will be adjusted by Change Order per the Contract Documents.
- 1.7.2. Tests and inspections not explicitly assigned to District are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 1.7.2.1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform the quality-control services.
 - 1.7.2.1.1. Contractor shall not employ same entity engaged by District, unless agreed to in writing by District.
 - 1.7.2.2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 1.7.2.3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 1.7.2.4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 1.7.2.5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- 1.7.3. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Document "Submittal Procedures."
- 1.7.4. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents' requirements.
- 1.7.5. Testing Agency Responsibilities: Cooperate with District, District's consultants, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1.7.5.1. Notify District, District's consultants, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

- 1.7.5.2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
- 1.7.5.3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
- 1.7.5.4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
- 1.7.5.5. Do not release, revoke, alter, or increase the Contract Documents' requirements or approve or accept any portion of the Work.
- 1.7.5.6. Do not perform any duties of Contractor.
- 1.7.6. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify testing agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1.7.6.1. Access to the Work.
 - 1.7.6.2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 1.7.6.3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 1.7.6.4. Facilities for storage and field curing of test samples.
 - 1.7.6.5. Delivery of samples to testing agencies.
 - 1.7.6.6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 1.7.6.7. Security and protection for samples and for testing and inspecting equipment at Project Site.
 - 1.7.6.8. Furnish tools, samples of materials, design mixes, equipment and assistance as requested.
 - 1.7.6.9. Provide and maintain, for the sole use of the Testing Agency, adequate facilities for the safe storage and proper curing of concrete test cylinders on the project site for the first 24 hours after casting as required by ASTM C31, Method of Making and Curing Concrete Test Specimens in the Field.
 - 1.7.6.10. Build and store masonry test prisms in a manner acceptable to the Testing Agency. Prisms to be tested shall remain at the job site until moved by Testing Agency personnel.
 - 1.7.6.11. Notify Testing Agency at least 10 working days in advance of any qualification testing for welding required herein.
 - 1.7.6.12. Notify Testing Agency at least 24 hours prior to expected time for operations requiring testing or inspection services.

- 1.7.6.13. Make arrangements with the Testing Agency and pay for additional samples and tests made for the Contractor's convenience or for retesting of failed samples.
- 1.7.6.14. For deficiencies requiring corrective action, submit in writing a description of the deficiency and a proposed correction to the District. After review and approval, the proposed corrective action shall be implemented and inspected by the Testing Agency. It is Contractor's responsibility to ascertain that the deficiency is corrected and inspected prior to the work being covered.
- 1.7.6.15. Retention of an independent Testing Agency by the District shall in no way relieve Contractor of responsibility for performing all work in accordance with the Contract Documents' requirements.
- 1.7.7. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1.7.7.1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8. TESTS AND SPECIAL INSPECTIONS

- 1.8.1. Tests and Special Inspections: District will engage a qualified testing agency to conduct tests and special inspections required by authorities having jurisdiction as follows:
 - 1.8.1.1. Soils: 2022 CBC 1705A.6
 - 1.8.1.2. Pile Foundations: 2022 CBC 1705A.7
 - 1.8.1.3. Cast in Place Concrete: 2022 CBC 1705A.8
 - 1.8.1.4. Post Installed Anchors: 2022 CBC 1705A.3.8 and Manufacturer's ICC-ES Report
 - 1.8.1.5. Reinforced Unit Masonry - 2022 CBC 1704A.4
 - 1.8.1.6. Structural Steel: 2022 CBC 1705A.2.1 and AISC 360, 341 and 358
 - 1.8.1.7. Cold-formed Steel Deck: 2022 CBC 1705A.2.2 and SDI QA/QC.
 - 1.8.1.8. Miscellaneous Steel: 2022 CBC 17.05A and AISC 360
 - 1.8.1.9. Spray Applied Fire Proofing: 2022 CBC [BF] 1705A.15
 - 1.8.1.10. Intumescent Fire-Resistant Coating: 2022 CBC 1705A.16
 - 1.8.1.11. Cladding and Non Load Bearing Walls: 2022 CBC 1705A.13.5
- 1.8.2. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specifications, and as follows:
 - 1.8.2.1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 1.8.2.2. Notifying District, District's consultants, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 1.8.2.3. Submitting a certified written report of each test, inspection, and similar quality-control service to District, with copy to Contractor and to authorities having jurisdiction.
 - 1.8.2.4. Submitting a final report of special tests and inspections at Project Completion, which includes a list of unresolved deficiencies.

1.8.2.5. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

1.8.2.6. Retesting and reinspecting corrected work.

2. PRODUCTS

2.1. GENERAL

2.1.1. Do not use any materials or equipment represented by samples until tests, if required, have been made and the materials or equipment found to be acceptable. Any product which becomes unfit for use after acceptance shall not be incorporated into the Work.

3. EXECUTION

3.1. TEST AND INSPECTION LOG

3.1.1. Prepare a record of tests and inspections. Include the following:

3.1.1.1. Date test or inspection was conducted.

3.1.1.2. Description of the Work tested and inspected.

3.1.1.3. Date test or inspection results were transmitted to District.

3.1.1.4. Identification of testing agency or special inspector conducting test or inspection.

3.1.2. Maintain log at Project Site. Post changes and modifications as they occur. Provide access to test and inspection log for District's reference during normal working hours.

3.2. REPAIR AND PROTECTION

3.2.1. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

3.2.1.1. Provide materials and comply with installation requirements specified in other Specifications. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

3.2.1.2. Comply with Document "Cutting and Patching" and all related Contract Documents' requirements.

3.2.2. Protect construction exposed by or for quality-control service activities.

3.2.3. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF DOCUMENT

DOCUMENT 01 42 13

ABBREVIATIONS AND ACRONYMS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions including without limitation, Contract Terms and Definitions; and
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any).

1.2. ABBREVIATIONS AND ACRONYMS FOR STANDARDS AND REGULATIONS

- 1.2.1. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations as indicated in Thomson Gale™ (www.gale.com), Gale Research's "Encyclopedia of Associations" or "Encyclopedia of Associations: National Organizations of the U.S.," or in Columbia Books' "National Trade & Professional Associations of the U.S."
- 1.2.2. Some of the applicable abbreviations and acronyms referenced in the Specifications or other Contract Documents have the following meanings, subject to updates or revisions based on the above-referenced publications:

- AA: Aluminum Association
- AAMA: Architectural Aluminum Manufacturers Association
- AASHTO: American Association of State Highway and Transportation Officials
- ABPA: Acoustical and Board Products Association
- ACI: American Concrete Institute
- AGA: American Gas Association
- AGC: Associated General Contractors
- AHC: Architectural Hardware Consultant
- AI: Asphalt Institute
- AIA: American Institute of Architects
- AIEE: American Institute of Electrical Engineers
- AISC: American Institute of Steel Construction
- AISI: American Iron and Steel Institute
- AMCA: Air Moving and Conditioning Association
- ANSI: American National Standards Institute
- APA: American Plywood Association
- ARI: Air Conditioning and Refrigeration Institute
- ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers
- ASME: American Society of Mechanical Engineers
- ASSE: American Society of Structural Engineers
- ASTM: American Society of Testing and Materials
- AWPB: American Wood Preservers Bureau

- AWPI: American Wood preservers Institute
- AWS: American Welding Society
- AWSC: American Welding Society Code
- AWI: Architectural Woodwork Institute
- AWWA: American Water Works Association
- BIA: Brick Institute of America
- CCR: California Code of Regulations
- CLFMI: Chain Link Fence Manufacturers Institute
- CMG: California Masonry Guild
- CRA: California Redwood Association
- CRSI: Concrete Reinforcing Steel Institute
- CS: Commercial Standards
- CSI: Construction Specifications Institute
- CTI: Cooling Tower Institute
- FGMA: Flat Glass Manufacturer’s Association
- FIA: Factory Insurance Association
- FM: Factory Mutual
- FS: Federal Specification
- FTI: Facing Title Institute
- GA: Gypsum Association
- ICC: International Code Council
- IEEE: Institute of Electrical and Electronic Engineers
- IES: Illumination Engineering Society
- LIA: Lead Industries Association
- MIA: Marble Institute of America
- MLMA: Metal Lath Manufacturers Association
- MS: Military Specifications
- NAAMM: National Association of Architectural Metal Manufacturers
- NBHA: National Builders Hardware Association
- NBFU: National Board of Fire Underwriters
- NBS: National Bureau of Standards
- NCMA: National Concrete Masonry Association
- NEC: National Electrical Code
- NEMA: National Electrical Manufacturers Association
- NFPA: National Fire Protection Association/National Forest Products Association
- NMWIA: National Mineral Wool Insulation Association
- NTMA: National Terrazzo and Mosaic Association
- NWMA: National Woodwork Manufacturer’s Association
- ORS: Office of Regulatory Services (California)
- OSHA: Occupational Safety and Health Act
- PCI: Precast Concrete Institute
- PCA: Portland Cement Association
- PDCA: Painting and Decorating Contractors of America
- PDI: Plumbing Drainage Institute
- PEI: Porcelain Enamel Institute
- PG&E: Pacific Gas & Electric Company
- PS: Product Standards
- SDI: Steel Door Institute; Steel Deck Institute
- SJI: Steel Joist Institute
- SSPC: Steel Structures Painting Council
- TCA: Tile Council of America

- TPI: Truss Plate Institute
- UBC: Uniform Building Code
- UL: Underwriters Laboratories Code
- UMC: Uniform Mechanical Code
- USDA: United States Department of Agriculture
- VI: Vermiculite Institute
- WCLA: West Coast Lumberman’s Association
- WCLB: West Coast Lumber Bureau
- WEUSER: Western Electric Utilities Service Engineering Requirements
- WIC: Woodwork Institute of California
- WPOA: Western Plumbing Officials Association

1.2.3. Additional Abbreviations and Symbols: Refer to the above-referenced publications or to Drawings for additional abbreviations and for symbols.

END OF DOCUMENT

DOCUMENT 01 42 16

GENERAL DEFINITIONS AND REFERENCES

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISION

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions including without limitation, Contract Terms and Definitions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any); and
- 1.1.4. Special Conditions.

1.2. DEFINITIONS

General: Basic Contract definitions are included in the General Conditions of the Contract for Construction. The following are in addition to those definitions.

- 1.2.1. "Alternate": A cost or credit for certain Work that may be added to or deducted from the Project.
- 1.2.2. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- 1.2.3. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- 1.2.4. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- 1.2.5. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- 1.2.6. "Provide": Furnish and install, complete and ready for the intended use.

1.3. QUALITY ASSURANCE

- 1.3.1. For products or workmanship specified by association, trade, or Federal Standards, Contractor shall comply with requirements of the standard, except when more stringent requirements are specified in the Contract Documents, or are required by applicable codes.
- 1.3.2. Contractor shall conform to current reference standard publication in effect on the date of bid opening.

- 1.3.3. Unless directed otherwise by the Contract Documents, Contractor shall obtain copies of referenced standards.
- 1.3.4. Unless directed otherwise by the Contract Documents, Contractor shall maintain a copy of referenced standards at jobsite until Completion.
- 1.3.5. If specified standards conflict with Contract Documents, Contractor shall request clarification from the District or the Architect before proceeding.
- 1.3.6. Governing Codes shall be as shown in the Contract Documents including, without limitation, the Specifications.

1.4. STANDARDS

- 1.4.1. Standard Specifications: References to codes, specifications and standards referred to in the Contract Documents shall mean, and are intended to be, the latest edition, amendment or revision of such reference standard in effect as of the date of these Contract Documents. If those standard specifications are revised prior to Completion of any part of the Work to which such revision would pertain, Contractor may, if acceptable to and approved by the District, perform such Work in accordance with the revised standard specifications.
- 1.4.2. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the District for a decision before proceeding.
- 1.4.3. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to District for a decision before proceeding.
- 1.4.4. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
- 1.4.5. Copies from the Publication Source: Where copies of standards are needed for performance of a required construction activity, Contractor shall obtain copies directly from the publication source.

1.5. SCHEDULE OF REFERENCES

The following information is intended only for the general assistance of Contractor. District does not represent the accuracy of the information. Contractor shall independently verify the information for each entity listed below:

| | | |
|------|---|--------------|
| AA | Aluminum Association 900 19th Street NW, Suite 300 Washington, DC 20006 www.aluminum.org | 202/862-5100 |
| AABC | Associated Air Balance Council 1518 K Street, NW, Suite 503 | 202/737-0202 |

| | | |
|--------|---|--------------|
| | Washington, DC 20005 www.aabchg.com | |
| AAMA | American Architectural Manufacturers Association 1827 Walden Office Sq., Suite 104 Schaumburg, IL 60173-4268 www.aamanet.org | 847/303-5664 |
| AASHTO | American Association of State Highway and Transportation Officials 444 North Capitol Street, Suite 249 Washington, DC 20001 www.aashto.org | 202/624-5800 |
| AATCC | American Association of Textile Chemists and Colorists P.O. Box 12215 One Davis Drive Research Triangle Park, NC 27709-2215 www.aatcc.org | 919/549-8141 |
| ACI | American Concrete Institute P.O. Box 9094 Farmington Hills, MI 48333-9094 www.aci-int.org | 248/848-3700 |
| ACPA | American Concrete Pipe Association 222 West Las Colinas Blvd., Suite 641 Irving, TX 75039-5423 www.concrete-pipe.org | 972/506-7216 |
| ADC | Air Diffusion Council 11 South LaSalle St., Suite 1400 Chicago, IL 60603 http://www.flexibleduct.org/index.asp | 312/201-0101 |
| AFPA | American Forest and Paper Association 1111 19th St., NW, Suite 800 Washington, DC 20036 http://www.afandpa.org/ | 202/463-2700 |
| AGA | American Gas Association 1515 Wilson Blvd. Arlington VA 22209 www.aga.com | 703/841-8400 |
| AHA | American Hardboard Association 1210 W. Northwest Hwy Palatine, IL 60067-1897 http://domensino.com/AHA/default.htm | 847/934-8800 |
| AI | Asphalt Institute Research Park Drive P.O. Box 14052 Lexington, KY 40512-4052 | 606/288-4960 |

www.asphaltinstitute.org

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| AIA | The American Institute of Architects 1735 New York Avenue, NW Washington, DC 20006-5292 www.aia.org | 202/626-7300 |
| AISC | American Institute of Steel Construction One East Wacker Drive, Suite 3100 Chicago, IL 60601-2001 http://www.aisc.org/ | 800/644-2400 |
| AITC | American Institute of Timber Construction 7012 S. Revere Pkwy., Suite 140 Englewood, CO 80112 www.aitc-glulam.org | 303/792-9559 |
| ALCA | Associated Landscape Contractors of America 12200 Sunrise Valley Drive, Suite 150 Reston, VA 20191 www.alca.org | 703/620-6363 |
| ALI | Associated Laboratories, Inc. P.O. Box 152837 1323 Wall St. Dallas, TX 75315 http://www.assoc-labs.com/ | 214/565-0593 |
| ALSC | American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875 | 301/972-1700 |
| AMCA | Air Movement and Control Association International, Inc. 30 W. University Drive Arlington Heights, IL 60004-1893 www.amca.org | 847/394-0150 |
| ANLA | American Nursery and Landscape Association 1250 Eye Street, NW, Suite 500 Washington, DC 20005 | 202/789-2900 |
| ANSI | American National Standards Institute 11 West 42nd Street, 13th Floor New York, NY 10036-8002 www.ansi.org | 212/642-4900 |
| APA | APA-The Engineered Wood Association P.O. Box 11700 Tacoma, WA 98411-0700 www.apawood.org | 206/565-6600 |
| APA | Architectural Precast Association P.O. Box 08669 Fort Myers, FL 33908-0669 | 941/454-6989 |

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| ARI | Air Conditioning and Refrigeration Institute 4301 Fairfax Drive, Suite 425 Arlington, VA 22203 www.ari.org | 703/524-8800 |
| ARMA | Asphalt Roofing Manufacturers Association Center Park 4041 Powder Mill Road, Suite 404 Calverton, MD 20705 | 301/231-9050 |
| ASA | Acoustical Society of America 500 Sunnyside Blvd. Woodbury, NY 11797 | 516/576-2360 |
| ASCE | American Society of Civil Engineers- World Headquarters 1801 Alexander Bell Drive Reston, VA 20190-4400 www.asce.org | 800/548-2723 703/295-6000 |
| ASHRAE | American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, NE Atlanta, GA 30329-2305 www.ashrae.org | 800/527-4723 404/636-8400 |
| ASLA | American Society of Landscape Architects 4401 Connecticut Ave., NW, 5th Floor Washington, DC 20008-2369 www.asla.org | 202/686-2752 |
| ASME | American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017-2392 www.asme.org | 800/434-2763 |
| ASPE | American Society of Plumbing Engineers 3617 Thousand Oaks Blvd., Suite 210 Westlake, CA 91362-3649 | 805/495-7120 |
| ASQC | American Society for Quality Control 611 E. Wisconsin Avenue Milwaukee, WI 53201-3005 www.asqc.org | 800/248-1946 414/272-8575 |
| ASSE | American Society of Sanitary Engineering 28901 Clemens Road Westlake, OH 44145 www.asse-plumbing.org | 216/835-3040 |
| ASTM | American Society for Testing and Materials 100 Barr Harbor Drive West Conshohocken, PA 19428-2959 www.astm.org | 610/832-9500 |

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| AWCI | Association of the Wall and Ceiling Industries--International 307 E. Annandale Road, Suite 200 Falls Church, VA 22042-2433 www.awci.org | 703/534-8300 |
| AWPA | American Wood-Preservers' Association 3246 Fall Creek Highway, Suite 1900 Granbury, TX 76049-7979 | 817/326-6300 |
| AWS | American Welding Society 550 NW LeJeune Road Miami, FL 33126 www.amweld.org | 800/443-9373 305/443-9353 |
| AWWA | American Water Works Association 6666 West Quincy Avenue Denver, CO 80235 www.awwa.org | 800/926-7337 303/794-7711 |
| BHMA | Builders' Hardware Manufacturers Association 355 Lexington Avenue, 17th Floor New York, NY 10017-6603 | 212/661-4261 |
| CBM | Certified Ballast Manufacturers Association 1422 Euclid Avenue, Suite 402 Cleveland, OH 44115-2094 | 216/241-0711 |
| CGA | Compressed Gas Association 1725 Jefferson Davis Hwy, Suite 1004 Arlington, VA 22202-4102 www.cganet.com | 703/412-0900 |
| CISCA | Ceilings & Interior Systems Construction Association 1500 Lincoln Hwy, Suite 202 St. Charles, IL 60174 www.cisca.org | 630/584-1919 |
| CISPI | Cast Iron Soil Pipe Institute 5959 Shallowford Road, Suite 419 Chattanooga, TN 37421 | 423/892-0137 |
| CPSC | Consumer Product Safety Commission East West Towers 4330 East-West Hwy. Bethesda, MD 20814 | 800/638-2772 |
| CPPA | Corrugated Polyethylene Pipe Association 432 N. Superior Street Toledo, OH 43604 | 800/510-2772 419/241-2221 |
| CRA | California Redwood Association 405 Enfrente Drive, Suite 200 | 415/382-0662 |

Novato, CA 94949

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| CRI | Carpet and Rug Institute 310 S. Holiday Avenue Dalton, GA 30722-2048 www.carpet-rug.com | 800/882-8846 706/278-3176 |
| CRSI | Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, IL 60173-4758 www.crsi.org | 847/517-1200 |
| CTI | Ceramic Tile Institute of America 12061 W. Jefferson Blvd. Culver City, CA 90230-6219 | 310/574-7800 |
| DHI | Door and Hardware Institute 14170 Newbrook Drive Chantilly, VA 20151-2223 www.dhi.org | 703/222-2010 |
| DIPRA | Ductile Iron Pipe Research Association 245 Riverchase Pkwy East, Suite O Birmingham, AL 35244 | 205/988-9870 |
| DOC | Department of Commerce 14th Street and Constitution Avenue, NW Washington, DC 20230 | 202/482-2000 |
| DOT | Department of Transportation 400 Seventh Street, SW Washington, DC 20590 | 202/366-4000 |
| EJMA | Expansion Joint Manufacturers Association 25 N. Broadway Tarrytown, NY 10591-3201 | 914/332-0040 |
| EPA | Environmental Protection Agency 401 M Street, SW Washington, DC 20460 | 202/260-2090 |
| FCICA | Floor Covering Installation Contractors Association P.O. Box 948 Dalton, GA 30722-0948 | 706/226-5488 |
| FM | Factory Mutual 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, MA 02062-9102 www.factorymutual.com | 781/255-4300 |
| FS | Federal Specifications Unit (Available from GSA) 470 East L'Enfant Plaza, SW, Suite 8100 | 202/619-8925 |

Washington, DC 20407

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| GA | Gypsum Association 810 First Street NE, Suite 510 Washington, DC 20002 www.usg.com | 202/289-5440 |
| GANA | Glass Association of North America 3310 SW Harrison Street Topeka, KS 66611-2279 www.glasswebsite.com/gana | 913/266-7013 |
| HMA | Hardwood Manufacturers Association 400 Penn Center Blvd., Suite 530 Pittsburgh, PA 15235-5605 www.hardwood.org | 412/828-0770 |
| HPVA | Hardwood Plywood and Veneer Association 1825 Michael Farraday Drive P.O. Box 2789 Reston, VA 22195-0789 www.hpva.org | 703/435-2900 |
| IEEE | Institute of Electrical and Electronic Engineers 345 E. 47th Street New York, NY 10017-2394 www.ieee.org | 800/678-4333 212/705-7900 |
| IESNA | Illuminating Engineering Society of North America 120 Wall Street, 17th Floor New York, NY 10005-4001 www.iesna.org | 212/248-5000 |
| ITS | Intertek Testing Services P.O. Box 2040 607/753-6711 3933 US Route 11 Cortland, NY 13045-7902 www.itsglobal.com | 800/345-3851 |
| LMA | Laminating Materials Association 116 Lawrence Street Hillsdale, NJ 07642-2730 www.lma.org | 201/664-2700 |
| MCAA | Mechanical Contractors Association of America 1385 Piccard Drive Rockville, MD 20850-4329 | 301/869-5800 |
| ML/SFA | Metal Lath/Steel Framing Association (A Division of the NAAMM) 8 South Michigan Avenue, Suite 1000 Chicago, IL 60603 | 312/456-5590 |
| MSS | Manufacturers Standardization Society for the Valve and Fittings Industry | 703/281-6613 |

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| | 127 Park Street, NE Vienna, VA 22180-4602 | |
| NAA | National Arborist Association P.O. Box 1094 603/673-3311 Amherst, NH 03031-1094 www.natlarb.com | 800/733-2622 |
| NAAMM | National Association of Architectural Metal Manufacturers 8 South Michigan Avenue, Suite 1000 Chicago, IL 60603 www.gss.net/naamm | 312/782-5590 |
| NAIMA | North American Insulation Manufacturers Association 44 Canal Center Plaza, Suite 310 Alexandria, VA 22314 www.naima.org | 703/684-0084 |
| NAPA | National Asphalt Pavement Association NAPA Building 5100 Forbes Blvd. Lanham, MD 20706-4413 | 301/731-4748 |
| NCSPA | National Corrugated Steel Pipe Association 1255 23rd Street, NW, Suite 850 Washington, DC 20037 www.ncspa.org | 202/452-1700 |
| NEBB | National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877-4121 | 301/977-3698 |
| NECA | National Electrical Contractors Association 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814-5372 | 301/657-3110 |
| NEI | National Elevator Industry 185 Bridge Plaza North, Suite 310 Fort Lee, NJ 07024 | 201/944-3211 |
| NEMA | National Electrical Manufacturers' Association 1300 N. 17th Street, Suite 1847 Rosslyn, VA 22209 www.nema.org | 703/841-3200 |
| NFPA | National Fire Protection Association One Batterymarch Park P.O. Box 9101 Quincy, MA 02269-9101 www.nfpa.org | 800/344-3555 617/770-3000 |
| NHLA | National Hardwood Lumber Association P.O. Box 34518 | 901/377-1818 |

Memphis, TN 38184-0518

www.natlhardwood.org

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| NIA | National Insulation Association 99 Canal Center Plaza, Suite 222 Alexandria, VA 22314 www.insulation.org | 703/683-6422 |
| NPA | National Particleboard Association 18928 Premiere Court Gaithersburg, MD 20879-1569 www.pbmdf.com | 301/670-0604 |
| NPCA | National Paint and Coatings Association 1500 Rhode Island Avenue, NW Washington, DC 20005-5597 www.paint.org | 202/462-6272 |
| NRCA | National Roofing Contractors Association O'Hare International Center 10255 W. Higgins Road, Suite 600 Rosemont, IL 60018-5607 www.roofonline.org | 800/323-9545 |
| NRMCA | National Ready Mixed Concrete Association 900 Spring Street Silver Spring, MD 20910 www.nrmca.org | 301/587-1400 |
| NSF | NSF International P.O. Box 130140 Ann Arbor, MI 48113-0140 www.nsf.org | 313/769-8010 |
| NUSIG | National Uniform Seismic Installation Guidelines 12 Lahoma Court Alamo, CA 94526 | 510/946-0135 |
| NWWDA | National Wood Window and Door Association 1400 E. Touhy Avenue, G-54 Des Plaines, IL 60018 www.nwwda.org | 800/223-2301 847/299-5200 |
| SHA | Occupational Safety and Health Administration (U.S. Department of Labor) 200 Constitution Ave., NW Washington, DC 20210 | 202/219-8148 |
| PCA | Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077-1083 www.portcement.org | 847/966-6200 |
| PDCA | Painting and Decorating Contractors of America | 800/332-7322 703/359-0826 |

3913 Old Lee Hwy, Suite 33-B
Fairfax, VA 22030
www.pdca.com

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| PDI | Plumbing and Drainage Institute 45 Bristol Drive, Suite 101 South Easton, MA 02375 | 800/589-8956 508/230-3516 |
| RFCI | Resilient Floor Covering Institute 966 Hungerford Drive, Suite 12-B Rockville, MD 20805-1714 | 301/340-8580 |
| RIS | Redwood Inspection Service c/o California Redwood Association 405 Enfrente Drive, Suite 200 Novato, CA 94949-7206 | 415/382-0662 |
| SDI | Steel Deck Institute P.O. Box 25 Fox River Grove, IL 60012 www.sdi.org | 847/462-1930 |
| SDI | Steel Door Institute 30200 Detroit Road Cleveland, OH 44145-1967 | 216/889-0010 |
| SMA | Stucco Manufacturers Association 14006 Ventura Blvd. Sherman Oaks, CA 91403 | 213/789-8733 |
| SMACNA | Sheet Metal and Airconditioning Contractors National Association, Inc. P.O. Box 221230 Chantilly, VA 20151-1209 www.smacna.org | 703/803-2980 |
| SPI | Society of the Plastics Industry, Inc. Spray Polyurethane Division 1801 K Street, NW, Suite 600K Washington, DC 20006 www.socplas.org | 800/951-2001 202/974-5200 |
| SSPC | Steel Structures Painting Council 40 24th Street, 6th Floor Pittsburgh, PA 15222-4643 | 412/281-2331 |
| TCA | Tile Council of America 100 Clemson Research Blvd. Anderson, SC 29625 | 864/646-8453 |
| TPI | Turfgrass Producers International 1855-A Hicks Road Rolling Meadows, IL 60008 | 800/405-8873 847/705-9898 |
| UL | Underwriters Laboratories, Inc. | 800/704-4050 |

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| | 333 Pfingston Road Northbrook, IL 60062 www.ul.com | 847/272-8800 |
| UNI | Uni-Bell PVC Pipe Association 2655 Villa Creek Drive, Suite 155 Dallas, TX 75234 www.members.aol.com/unibell1 | 972/243-3902 |
| USDA | U.S. Department of Agriculture 14th St. and Independence Ave., SW Washington, DC 20250 | 202/720-8732 |
| WA | Wallcoverings Association 401 N. Michigan Avenue Chicago, IL 60611-4267 | 312/644-6610 |
| WCLIB | West Coast Lumber Inspection Bureau P.O. Box 23145 Portland, OR 97281-3145 | 503/639-0651 |
| WCMA | Window Covering Manufacturers Association 355 Lexington Ave., 17th Floor New York, NY 10017-6603 | 212/661-4261 |
| WIC | Woodwork Institute of California P.O. Box 980247 West Sacramento, CA 95798-0247 | 916/372-9943 |
| WLPDIA | Western Lath/Plaster/Drywall Industries Association 8635 Navajo Road San Diego, CA 92119 | 619/466-9070 |
| WMMPA | Wood Moulding & Millwork Producers Association 507 First Street Woodland, CA 95695 www.wmmpa.com | 800/550-7889 916/661-9591 |
| WRI | Wire Reinforcement Institute 203 Loudoun Street, SW Leesburg, VA 20175-2718 | 703/779-2339 |
| WWPA | Western Wood Products Association Yeon Building 522 S.W. 5th Avenue Portland, OR 97204-2122 | 503/224-3930 |

END OF DOCUMENT

DOCUMENT 01 45 29

TESTING LABORATORY SERVICES

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISION

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions, including “Tests and Inspections”; and
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any).

1.2. DOCUMENT INCLUDES

- 1.2.1. Observation and Supervision.
- 1.2.2. Testing Laboratories and Agencies
- 1.2.3. Tests and Inspections
- 1.2.4. Selection and Payment
- 1.2.5. District's Testing Laboratory Responsibilities
- 1.2.6. Laboratory reports.
- 1.2.7. Limits on testing laboratory authority.
- 1.2.8. Contractor responsibilities.
- 1.2.9. Schedule of inspections and tests.
- 1.2.10. Project Inspector’s Access to Site

1.3. REFERENCES

- 1.3.1. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- 1.3.2. ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
- 1.3.3. CBC - California Building Code.
- 1.3.4. UBC - Uniform Building Code.
- 1.3.5. Title 24, Parts 1 and 2, of the California Code of Regulations. Contractor shall keep a copy of these available at the job Site for ready reference during construction

- 1.3.6. DSA - Division of the State Architect, Office of Regulation Services, Structural Safety Section. DSA shall be notified at or before the start of construction.

1.4. OBSERVATION AND SUPERVISION

- 1.4.1. The District and Architect or their appointed representatives will review the Work and the Contractor shall provide facilities and access to the Work at all times as required to facilitate this review. Administration by the Architect and any consulting Structural Engineer will be in accordance with applicable regulations, including, without limitation, 24 C.C.R. § 4-341.
- 1.4.2. One or more Project Inspector(s) approved by DSA and employed by or in contract with the District("Project Inspector"), will observe the Work in accordance with 24 C.C.R. §§ 4-333(b) and 4-342:
- 1.4.3. Project Inspector shall have access to the Work wherever it is in preparation or progress for ascertaining that the Work is in accordance with the Contract Documents and all applicable code sections. Contractor shall provide facilities and access as required and shall provide assistance for sampling or measuring materials.
 - 1.4.3.1. Project Inspector will notify District and Architect and inform Contractor of any observed failure of Work or material to conform to Contract Documents.
 - 1.4.3.2. The Project Inspector shall observe and monitor all testing and inspection activities required.
- 1.4.4. Contractor shall conform with all applicable laws as indicated in the Contract Documents, including, without limitation, to 24 C.C.R. § 4-343. Contractor shall supervise and direct the Work and maintain a competent superintendent on the Project who is authorized to act in all matters pertaining to the Work. The Contractor shall inspect all materials, as they arrive, for compliance with the Contract Documents. Contractor shall reject defective Work or materials immediately upon delivery or failure of the Work or material to comply with the Contract Documents. The Contractor shall submit verified reports as indicated in the Contract Documents, including, without limitation, the Specifications and as required by 24 C.C.R. § 4-336.

1.5. TESTING LABORATORIES AND AGENCIES

- 1.5.1. Testing agencies and tests shall be in conformance with the Contract Documents and the requirements of 24 C.C.R. § 4-335.
- 1.5.2. Testing and inspection in connection with earthwork shall be under the direction of the District's consulting soils engineer ("Soils Engineer").
- 1.5.3. Testing and inspection of construction materials and workmanship shall be performed by a qualified laboratory ("Testing Laboratory" or "Laboratory"). The Testing Laboratory shall be under direction of an engineer registered in the State of California, shall conform to requirements of ASTM E329, and shall be employed by or in contract with the District.

1.6. TESTS AND INSPECTIONS

- 1.6.1. Contractor shall be responsible for notifying District and Project Inspector of all required tests and inspections. Contractor shall notify District and Project Inspector forty-eight (48) hours in advance of performing any Work requiring testing or inspection.
- 1.6.2. Contractor shall provide access to Work to be tested and furnish incidental labor, equipment, and facilities to facilitate all inspections and tests.
- 1.6.3. District will pay for first inspections and tests required by the Title 24 and other inspections or tests that District and/or Architect may direct to have made, including, but not limited to, the following principal items:
 - 1.6.3.1. Tests and observations for earthwork and pavings.
 - 1.6.3.2. Tests for concrete mix designs, including tests of trial batches.
 - 1.6.3.3. Tests and inspections for structural steel work.
 - 1.6.3.4. Field tests for framing lumber moisture content.
 - 1.6.3.5. Additional tests directed by District that establish that materials and installation comply with the Contract Documents.
 - 1.6.3.6. Test and observation of welding and expansion anchors.
 - 1.6.3.7. Factory observation of components and assembly of modular prefabrication structures and buildings.
- 1.6.4. District may at its discretion, pay and back charge Contractor for:
 - 1.6.4.1. Retests or reinspections, if required, and tests or inspection required due to Contractor error or lack of required identifications of material.
 - 1.6.4.2. Uncovering of work in accordance with Contract Documents.
 - 1.6.4.3. Testing done on weekends, holidays, and overtime will be chargeable to Contractor for the overtime portion.
 - 1.6.4.4. Testing done off site.
- 1.6.5. Testing and inspection reports and certifications:
 - 1.6.5.1. If initially received by Contractor, Contractor shall provide to each of the following a copy of the agency or laboratory report of each test or inspection or certification: District; Construction Manager, if any; Architect; Consulting Engineer, if any; Other Engineers on the Project, as appropriate; and; Project Inspector.
 - 1.6.5.2. When the test or inspection is one required by the Title 24, a copy of the report shall also be provided to the DSA.

1.7. SELECTION AND PAYMENT

- 1.7.1. District will hire and pay for services of an independent Testing Laboratory to perform specified inspection and testing as specified by District's Testing Laboratory.

- 1.7.2. District's hiring of Testing Laboratory shall in no way relieve Contractor of its obligation to perform work in accordance with requirements of Contract Documents.

1.8. DISTRICT'S TESTING LABORATORY RESPONSIBILITIES

- 1.8.1. Test samples of mixes submitted by Inspector.
- 1.8.2. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.
- 1.8.3. Notify Architect and Contractor of observed irregularities or non-conformance of Work or Products.
- 1.8.4. Attend preconstruction conferences and progress meetings when requested by Architect.

1.9. LABORATORY REPORTS

- 1.9.1. After each inspection and test, District shall then submit one copy of laboratory report to Contractor. Reports of test results of materials and inspections found not to be in compliance with the requirements of the Contract Documents shall be forwarded immediately.
- 1.9.2. Each Testing Laboratory shall submit a verified report covering all of the tests which were required to be made by that agency during the progress of the Project. Such report shall be furnished each time that Work is suspended, covering the tests up to that time and at the Completion of the Project, covering all tests.

1.10. LIMITS ON TESTING LABORATORY AUTHORITY

- 1.10.1. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- 1.10.2. Laboratory may not approve or accept any portion of the Work.
- 1.10.3. Laboratory may not assume any duties of Contractor.
- 1.10.4. Laboratory has no authority to stop the Work.

1.11. CONTRACTOR RESPONSIBILITIES

- 1.11.1. Submit proposed items for testing as required herein and/or as further required in the Contract Documents to Architect for review in accordance with applicable specifications.
- 1.11.2. Cooperate with Laboratory personnel, and provide access to the Work and to manufacturer's facilities.
- 1.11.3. Notify Architect, District, and Testing Laboratory 48 hours prior to expected time for operations requiring inspection and testing services.
- 1.11.4. When tests or inspections cannot be performed after such notice, reimburse District for Laboratory personnel and travel expenses incurred due to the Contractor's negligence.

1.11.5. Contractor shall notify District a sufficient time in advance of the manufacture of material to be supplied by Contractor pursuant to the Contract Documents, which must by terms of the Contract be tested, in order that the District may arrange for the testing of same at the source of supply.

1.11.5.1. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice that such testing and inspection will not be required shall not be incorporated in the Work.

1.11.6. Contract and pay for services of District's Testing Laboratory to perform additional inspections, sampling and testing required when initial tests indicate Contractor's work and/or materials does not comply with Contract Documents.

1.12. SCHEDULE OF INSPECTIONS AND TESTS

The Testing Laboratory shall perform tests and inspections for the following in conformance with the (CBC) California Building Code (International Building Code with State of California Amendments), California Code of Regulations, Title 24, Part 2:

- Structural Tests and Special Inspections (Chapter 17A)
 - Special Inspections (§ 1704A)
- Soils and Foundations (Chapter 18A)
 - Geotechnical Investigations (§ 1803A)
- Concrete (Chapter 19A)
 - Specifications for Tests and Materials
 - Concrete Quality, Mixing and Placing
 - Concrete Reinforcement and Anchor Testing Inspection (§ 1916A)
- Masonry (Chapter 21A)
 - Masonry Construction Materials (§ 2103A)
 - Masonry Quality (§ 2103A)
 - Quality Assurance (§ 2105A)
- Structural Steel (Chapter 22A)
 - Structural Steel (§ 2205A)
 - Identification & Protection of Steel for Structural Purposes (§ 2203A)
 - Inspection and Tests of Structural Steel (§ 2212A)
- Wood (Chapter 23)
 - Minimum Standards and Quality (§ 2303)
 - Wood Construction (§ 1704A.6)
- Exterior Walls (Chapter 14)
 - Masonry Units (§ 1404.4)
 - Masonry Construction Materials (§ 2103A)
 - Exterior Insulation and Finish Systems (§ 1408)
- Roof Assemblies and Roofing Structures (Chapter 15)
 - Materials (§ 1506)
- Aluminum (Chapter 20)
 - Materials (§ 2002.1)
 - Inspection (§ 2003.1)

1.12.1. Plumbing

Testing as specified in Division 15 including, but not limited to: Sterilization, soil waste and vent, water piping, source of water, gas piping, downspouts and storm drains.

1.12.2. Automatic Fire Sprinklers (where applicable)

Testing as specified in Division 15 shall include, but not be limited to: hydrostatic pressure.

1.12.3. Heating, Ventilating and Air Conditioning

Testing as specified in Division 15 shall include, but not be limited to: Ductwork tests, cooling tower tests, boiler tests, controls testing, piping tests, water and air systems, and test and balance of heating and air conditioning systems.

1.12.4. Electrical

Testing as specified in Division 16, including, but not limited to: Equipment testing, all electrical system operations, grounding system and checking insulation after cable is pulled.

1.13. PROJECT INSPECTOR'S ACCESS TO SITE

1.13.1. A Project Inspector employed by the District in accordance with the requirement of State of California Code of Regulations, Title 24, Part 1 will be assigned to the Work. Project Inspector's duties are specifically defined in 24. C.C.R. §4-342, and as indicated in the General Conditions.

1.13.2. District and Construction Manager shall at all times have access for the purpose of inspection to all parts of the Work and to the shops wherein the Work is in preparation, and Contractor shall at all times maintain proper facilities and provide safe access for such inspection.

1.13.3. The Work in all stages of progress shall be subject to the personal continuous observation of the Inspector. Inspector shall have free access to any or all parts of the Work at any time. Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep Inspector fully informed respecting the progress and manner of the Work and the character of the materials. Inspection of the Work shall not relieve the Contractor from any obligation set forth in the Contract Documents.

1.13.4. The Inspector is not authorized to change, revoke, alter, enlarge or decrease in any way any requirement of the Contract Documents, drawings, specifications or subsequent change orders.

1.13.5. Whenever there is insufficient evidence of compliance with any of the provisions of Title 24 or evidence that any material or construction does not conform to the requirements of Title 24, the Division of the State Architect may require tests as proof of compliance. Test methods shall be as specified herein or by other recognized and accepted test methods determined by the Division of the State Architect. All tests shall be performed by a testing laboratory accepted by the Division of the State Architect.

END OF DOCUMENT

DOCUMENT 01 50 00

TEMPORARY FACILITIES AND CONTROLS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Site Standards; and
- 1.1.5. Temporary Tree and Plant Protection.

1.2. TEMPORARY UTILITIES

1.2.1. Electric Power and Lighting:

- 1.2.1.1. Contractor will furnish and pay for power during the course of the work to the extent power is not in the building(s) or on the Site. Contractor shall be responsible for providing temporary facilities required on the Site to point of intended use.
- 1.2.1.2. Contractor shall furnish, wire for, install, and maintain temporary electrical lights wherever it is necessary to provide illumination for the proper performance and/or observation of the Work: a minimum of 20 foot-candles for rough work and 50 foot-candles for finish work.
- 1.2.1.3. Contractor shall be responsible for maintaining existing lighting levels in the Project vicinity should temporary outages or service interruptions occur.

1.2.2. Heat and Ventilation:

- 1.2.2.1. Contractor shall provide temporary heat to maintain environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation and curing of materials, and to protect materials and finishes from damage due to improper temperature and humidity conditions. Portable heaters shall be standard units complete with controls.
- 1.2.2.2. Contractor shall provide forced ventilation and dehumidification, as required, of enclosed areas for proper installation and curing of materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors, and gases.
- 1.2.2.3. Contractor shall pay the costs of installation, maintenance, operation, and removal of temporary heat and ventilation, including costs for fuel consumed, required for the performance of the Work.

1.2.3. **Water:**

1.2.3.1. Contractor will furnish and pay for water during the course of the work. Contractor shall be responsible for providing temporary facilities required.

1.2.3.2. Contractor shall make potable water available for human consumption.

1.2.4. **Sanitary Facilities:**

1.2.4.1. Contractor shall provide sanitary temporary facilities in no fewer numbers than required by law and such additional facilities as may be directed by the Inspector for the use of all workers. The facilities shall be maintained in a sanitary condition at all times and shall be left at the Site until removal is directed by the District or Contractor completes all Work.

1.2.4.2. Use of toilet facilities in the Site shall not be permitted except by consent of the Project Inspector and District.

1.2.5. **Telephone Service:**

1.2.5.1. Contractor shall arrange with local telephone service company for telephone service for the performance of the Work. Contractor shall, at a minimum, provide in its field office one line for telephone and one line for fax machine.

1.2.5.2. Contractor shall pay the costs for telephone and fax lines installation, maintenance, service, and removal; for Construction Site Office, Construction Manager's Office and Inspector's Office.

1.2.6. **Fire Protection:**

1.2.6.1. Contractor shall provide and maintain fire extinguishers and other equipment for fire protection. Such equipment shall be designated for use for fire protection only and shall comply with all requirements of the California Fire, State Fire Marshall and/or its designee.

1.2.6.2. Where on-site welding and burning of steel is unavoidable, Contractor shall provide protection for adjacent surfaces.

1.2.7. **Trash Removal:**

1.2.7.1. Contractor shall provide trash removal on a timely basis from all Site Offices and throughout the Site.

1.2.8. **Temporary Facilities:**

1.2.8.1. Contractor shall provide sufficient space and facilities for its own force's needs.

1.2.8.2. In addition, unless otherwise indicated in the Contract Documents, Contractor shall provide the following facilities, trailers, offices, furniture and:

1.2.8.2.1. One (1) 12X60 office trailer with two (2) offices for two (2) District representatives, with bathroom, common space between both offices;

- 1.2.8.2.2. One (1) 12X20 Project Inspector's Trailer/Office;
- 1.2.8.2.3. Basic furniture: chair, desks, plan table, conference room table, and chairs; and
- 1.2.8.2.4. Basic services: fixed line for phone, fax, and high speed internet service.

1.3. CONSTRUCTION AIDS

1.3.1. Plant and Equipment:

- 1.3.1.1. Contractor shall furnish, operate, and maintain a complete plant for fabricating, handling, conveying, installing, and erecting materials and equipment; and for conveyances for transporting workmen. Include elevators, hoists, debris chutes, and other equipment, tools, and appliances necessary for performance of the Work.
- 1.3.1.2. Contractor shall maintain plant and equipment in safe and efficient operating condition. Damages due to defective plant and equipment, and uses made thereof, shall be repaired by Contractor at no expense to the District.

- 1.3.2. No District tools or equipment shall be used by Contractor or its subcontractors for the performance of the Work.

1.4. BARRIERS AND ENCLOSURES

- 1.4.1. Contractor shall obtain District's written permission for locations and types of temporary barriers and enclosures, including fire-rated materials proposed for use, prior to their installation.
- 1.4.2. Contractor shall provide a six (6) foot high, chain link perimeter fence with posts driven into the ground and fabric screen as a temporary barrier around construction area. Contractor shall provide and maintain temporary enclosures to prevent public entry and to protect persons using other buildings and portions of the Site and/or Premises. Contractor shall remove temporary fence, barriers and enclosure upon Completion of the Work.
- 1.4.3. Contractor shall provide site access to existing facilities for persons using other buildings and portions of the Site, for the public, and for deliveries and other services and activities.

1.5. SECURITY

Contractor shall secure all construction equipment, machinery and vehicles, park and store only within fenced area, and render inoperable during non-work hours. Contractor is responsible for ensuring that no construction materials, tools, equipment, machinery or vehicles can be used for unauthorized entry or other damage or interference to activities and security of existing facilities adjacent to and in the vicinity of the Project Site.

1.6. TEMPORARY CONTROLS

1.6.1. Noise Control:

1.6.1.1. Contractor acknowledges that adjacent facilities may remain in operation during all or a portion of the Work, and Contractor shall take all reasonable precautions to minimize noise as required by applicable laws and the Contract Documents.

1.6.1.2. Notice of proposed noisy operations, including without limitation, operation of pneumatic demolition tools, concrete saws, and other equipment, shall be submitted to District a minimum of forty-eight (48) hours in advance of their performance.

1.6.2. Noise and Vibration:

1.6.2.1. Equipment and impact tools shall have intake and exhaust mufflers.

1.6.2.2. Contractor shall cooperate with District to minimize and/or cease the use of noisy and vibratory equipment if that equipment becomes objectionable by its longevity.

1.6.3. Dust and Dirt:

1.6.3.1. Contractor shall conduct demolition and construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulating in the Work and adjacent areas including, without limitation, occupied facilities.

1.6.3.2. Contractor shall periodically water exterior demolition and construction areas to minimize the generation of dust and dirt.

1.6.3.3. Contractor shall ensure that all hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins, and as otherwise required by local and state ordinance.

1.6.3.4. Contractor shall prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drain lines.

1.6.4. Surface and Subsurface Water:

Contractor shall not permit surface and subsurface water, and other liquids, to accumulate in or about the vicinity of the Premises. Should accumulation develop, Contractor shall control the water or other liquid, and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods.

1.6.5. Pollution:

1.6.5.1. No burning of refuse, debris, or other materials shall be permitted on or in the vicinity of the Premises.

1.6.5.2. Contractor shall comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of the Work including, without limitation, demolition, construction, and disposal operations.

1.6.6. Lighting

If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.

1.7. JOB SIGN(S)

1.7.1. General:

1.7.1.1. Contractor shall provide and maintain and locate a Project identification sign with the design, text, and colors designated by District and/or the Architect.

1.7.1.2. Signs other than the specified Project sign and or signs required by law, for safety, or for egress, shall not be permitted, unless otherwise approved in advance by the District.

1.7.2. Materials:

1.7.2.1. Structure and Framing: Structurally sound, new or used wood or metal; wood shall be nominal 3/4-inch exterior grade plywood.

1.7.2.2. Sign Surface: Minimum 3/4-inch exterior grade plywood.

1.7.2.3. Rough Hardware: Galvanized.

1.7.2.4. Paint: Exterior quality, of type and colors selected by the District and/or the Architect.

1.7.3. Fabrication:

1.7.3.1. Contractor shall fabricate to provide smooth, even surface for painting.

1.7.3.2. Size: 4'-0" x 8'-0", unless otherwise indicated.

1.7.3.3. Contractor shall paint exposed surfaces of supports, framing, and surface material with exterior grade paint: one coat of primer and one coat of finish paint.

1.7.3.4. Text and Graphics: As indicated.

1.8. PUBLICITY RELEASES

Contractor shall not release any information, story, photograph, plan, or drawing relating to information about the Project to anyone, including press and other public communications medium, including, without limitation, on website(s).

END OF DOCUMENT

DOCUMENT 01 52 10

SITE STANDARDS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS:

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions, including without limitation, Site Access, Conditions, and Regulations;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Drug-Free Workplace Certification;
- 1.1.5. Tobacco-Free Environment Certification;
- 1.1.6. Criminal Background Investigation/Fingerprinting Certification; and
- 1.1.7. Temporary Facilities and Controls.

1.2. REQUIREMENTS OF THE DISTRICT

1.2.1. Drug-Free Schools and Safety Requirements:

- 1.2.1.1. All school sites and other District Facilities have been declared "Drug-Free Zones." No drugs, alcohol, smoking or the use of tobacco products are allowed at any time in any buildings, Contractor-owned vehicles or vehicles owned by others while on District property. No students, staff, visitors, or contractors are to use drugs on these sites.
- 1.2.1.2. Contractor shall post: "Non-Smoking Area" in a highly visible location on Site. Contractor may designate a smoking area outside of District property within the public right-of-way, provided that this area remains quiet and unobtrusive to adjacent neighbors. This smoking area must be kept clean at all times.
- 1.2.1.3. Contractor shall ensure that no alcohol, firearms, weapons, or controlled substances enter or are used at the Site. Contractor shall immediately remove from the Site and terminate the employment of any employee(s) found in violation of this provision.

- 1.2.2. **Language:** Unacceptable and/or loud language will not be tolerated, "Cat calls" or other derogatory language toward students or public will not be allowed.

1.2.3. Disturbing the Peace (Noise and Lighting):

- 1.2.3.1. Contractor shall observe the noise ordinance of the Site at all times including, without limitation, all applicable local, city, and/or state laws, ordinances, and/or regulations regarding noise and allowable noise levels.

- 1.2.3.2. The use of radios, etc., shall be controlled to keep all sound at a level that cannot be heard beyond the immediate area of use. District reserves the right to prohibit the use of radios at the Site, except for handheld communication radios.
- 1.2.3.3. If portable lights are used after dark, the lights must be located so as not to direct light into neighboring properties.

1.2.4. **Traffic:**

- 1.2.4.1. Driving on the Premises shall be limited to periods when students and public are not present. If driving or deliveries must be made during the school hours, two (2) or more ground guides shall lead the vehicle across the area of travel. In no case shall driving take place across playgrounds or other pedestrian paths during recess, lunch, and/or class period changes. The speed limit on-the Premises shall be five (5) miles per hour (maximum) or less if conditions require.
- 1.2.4.2. All paths of travel for deliveries, including without limitation, material, equipment, and supply deliveries, shall be reviewed and approved by District in advance. Any damage will be repaired to the pre-damaged condition by the Contractor.
- 1.2.4.3. District shall designate a construction entry to the Site. If Contractor requests, District determines it is required, and to the extent possible, District shall designate a staging area so as not to interfere with the normal functioning of school facilities. Location of gates and fencing shall be approved in advance with District and at Contractor's expense.
- 1.2.4.4. Parking areas shall be reviewed and approved by District in advance. No parking is to occur under the drip line of trees or in areas that could otherwise be damaged.
- 1.2.4.5. All of the above shall be observed and complied with by the Contractor and all workers on the Site. Failure to follow these directives could result in individual(s) being suspended or removed from the work force at the discretion of the District. The same rules and regulations shall apply equally to delivery personnel, inspectors, consultants, and other visitors to the Site.

END OF DOCUMENT

DOCUMENT 01 60 00

MATERIALS AND EQUIPMENT

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions.
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any); and
- 1.1.4. Imported Materials Certification.

1.2. MATERIALS AND EQUIPMENT

- 1.2.1. Only items approved by the District and/or Architect shall be used.
- 1.2.2. Contractor shall submit lists of Products and other Product information in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.

1.3. MATERIALS AND EQUIPMENT COLORS

- 1.3.1. The Contractor shall comply with all schedule(s) of colors provided by the District and/or Architect.
- 1.3.2. No individual color selections will be made until after approval of all pertinent materials and equipment and after receipt of appropriate samples in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.
- 1.3.3. Contractor shall request priority in writing for any item requiring advance ordering to maintain the approved Construction Schedule.

1.4. DELIVERY, STORAGE, AND HANDLING

- 1.4.1. Contractor shall deliver manufactured materials in original packages, containers, or bundles (with seals unbroken), bearing name or identification mark of manufacturer. District may inspect materials prior to Contractor unloading the delivered materials. District may reject any materials that do not conform to the Contract Documents.
- 1.4.2. Contractor shall deliver fabrications in as large assemblies as practicable; where specified as shop-primed or shop-finished, package or crate as required to preserve such priming or finish intact and free from abrasion.

- 1.4.3. Contractor shall store materials in such a manner as necessary to properly protect them from damage. Materials or equipment damaged by handling, weather, dirt, or from any other cause will not be accepted.
- 1.4.4. Materials that have been warehoused for long periods of time, stored or transported in improper environment, improperly packaged, inadequately labeled, poorly protected, excessively shipped, deviated from normal distribution pattern, or reassembled are not acceptable.
- 1.4.5. Contractor shall store materials so as to cause no obstructions of sidewalks, roadways, or underground services. Contractor shall protect materials and equipment furnished pursuant to the Contract Documents.
- 1.4.6. Contractor may store materials on Site with prior written approval by District; all materials shall remain under Contractor's control and Contractor shall remain liable for any damage to the materials. Should the Project Site not have storage area available, the Contractor shall provide for off-site storage at no cost to District.
- 1.4.7. When any room in Project is used as a shop or storeroom, Contractor shall be responsible for any repairs, patching, or cleaning necessary due to that use. Location of storage space shall be subject to prior written approval by District.

2. PRODUCTS

2.1. MANUFACTURERS

- 2.1.1. Manufacturers listed in various sections of the Contract Documents are names of those manufacturers that are believed to be capable of supplying one or more of the items specified therein.
- 2.1.2. The listing of a manufacturer does not imply that every product of that manufacturer is acceptable or as meeting the requirements of the Contract Documents.

2.2. FACILITIES AND EQUIPMENT

Contractor shall provide, install, maintain, and operate a complete and adequate facility for handling, execution, disposal, and distribution of materials and equipment as required for proper and timely performance of Work.

2.3. MATERIALS REFERENCE STANDARDS

Where materials are specified solely by reference to "standard specifications" or other general reference, and if requested by District, Contractor shall submit for review data on actual materials proposed to be incorporated into Work, listing name and address of vendor, manufacturer, or producer, and trade or brand names of those materials, and data substantiating compliance with standard specifications.

3. EXECUTION

3.1. WORKMANSHIP

- 3.1.1. Where not more specifically described in any other Contract Documents, workmanship shall conform to methods and operations of best standards and accepted practices of trade or trades involved and shall include items of fabrication, construction, or installation regularly furnished or required for completion (including finish and for successful operation, as intended).
- 3.1.2. Work shall be executed by tradespersons skilled in their respective field of work. When completed, parts shall have been durably and substantially built and present a neat appearance.

3.2. COORDINATION

- 3.2.1. Contractor shall coordinate installation of materials and equipment so as to not interfere with installation of other Work. Adjustment or rework because of Contractor's failure to coordinate will be at no additional cost to District.
- 3.2.2. Contractor shall examine in-place materials and equipment for readiness, completeness, fitness to be concealed or to receive Work , and compliance with Contract Documents. Concealing or covering work constitutes acceptance of additional cost which will result should in-place materials and equipment be found unsuitable for receiving other work or otherwise deviating from the requirements of the Contract Documents.

3.3. COMPLETENESS

Contractor shall provide all portions of the Work, unless clearly stated otherwise, installed complete and operational with all elements, accessories, anchorages, utility connections, etc., in a manner to ensure well-balanced performance, in accordance with manufacturer's recommendations and in accordance with Contract Documents. For example, electric water coolers require water, electricity, and drain services; roof drains require drain systems; sinks fit within countertop, etc. Terms such as "installed complete," "operable condition," "for use intended," "connected to all utilities," "terminate with proper cap," "adequately anchored," "patch and refinish," and "to match similar" should be assumed to apply in all cases, except where completeness of functional or operable condition is specifically stated as not required.

3.4. APPROVED INSTALLER OR APPLICATOR

Contractor shall ensure that all installations are only performed by a manufacturer's approved installer or applicator.

3.5. MANUFACTURER'S RECOMMENDATIONS

All installations shall be in accordance with manufacturer's published recommendations and specific written directions of manufacturer's representative. Should the Contract Documents differ from recommendations of manufacturer or directions of manufacturer's representative, Contractor shall analyze differences, make recommendations to the District and the Architect in writing, and shall not proceed until interpretation or clarification has been issued by the District and/or the Architect.

END OF DOCUMENT

DOCUMENT 01 66 10

DELIVERY, STORAGE AND HANDLING

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions, including, without limitation, Site Access, Conditions and Requirements; and
- 1.1.2. Special Conditions.

1.2. PRODUCTS

- 1.2.1. Products are as defined in the General Conditions.
- 1.2.2. Contractor shall not use and/or reuse materials and/or equipment removed from existing Premises, except as specifically permitted by the Contract Documents.
- 1.2.3. Contractor shall provide interchangeable components of the same manufacturer, for similar components.

1.3. TRANSPORTATION AND HANDLING

- 1.3.1. Contractor shall transport and handle Products in accordance with manufacturer's instructions.
- 1.3.2. Contractor shall promptly inspect shipments to confirm that Products comply with Contract requirements, are of correct quantity, and are undamaged.
- 1.3.3. Contractor shall provide equipment and personnel to properly handle Products to prevent soiling, disfigurement, or damage.

1.4. STORAGE AND PROTECTION

- 1.4.1. Contractor shall store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Contractor shall store sensitive Products in weather-tight, climate controlled enclosures.
- 1.4.2. Contractor shall place fabricated Products that are stored outside, on above-ground sloped supports.
- 1.4.3. Contractor shall provide off-site storage and protection for Products when Site does not permit on-site storage or protection.

- 1.4.4. Contractor shall cover Products subject to deterioration with impervious sheet covering and provide ventilation to avoid condensation.
- 1.4.5. Contractor shall store loose granular materials on solid flat surfaces in a well-drained area and prevent mixing with foreign matter.
- 1.4.6. Contractor shall provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- 1.4.7. Contractor shall arrange storage of Products to permit access for inspection and periodically inspect to assure Products are undamaged and are maintained under specified conditions.

END OF DOCUMENT

DOCUMENT 01 73 00

EXECUTION

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Coordination and Project Meetings;
- 1.1.5. Submittals;
- 1.1.6. Materials and Equipment;
- 1.1.7. Cutting and Patching;
- 1.1.8. Contract Closeout and Final Cleaning; and
- 1.1.9. General Commissioning Requirements.

1.2. SUMMARY

- 1.2.1. This Document includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1.2.1.1. Construction layout;
 - 1.2.1.2. Field engineering and surveying;
 - 1.2.1.3. General installation of products;
 - 1.2.1.4. Owner furnished, Contractor installed items;
 - 1.2.1.5. Coordination of District-installed products;
 - 1.2.1.6. Progress cleaning;
 - 1.2.1.7. Staring and adjusting;
 - 1.2.1.8. Protection of installed construction; and
 - 1.2.1.9. Correction of the Work.

1.3. SUBMITTALS

- 1.3.1. Qualification Data: For land surveyor or professional engineer.
- 1.3.2. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- 1.3.3. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept the materials as classified, for hazardous waste disposal.
- 1.3.4. Certified Surveys: Submit electronic files and three (3) paper copies signed by land surveyor or professional engineer.
- 1.3.5. Final Property Survey: Submit electronic files and three (3) paper copies showing the Work performed and record survey data.

2. EXECUTION

2.1. EXAMINATION

- 2.1.1. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning Site Work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 2.1.1.1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2.1.1.2. Furnish location data for Work related to Project that must be performed by public utilities serving the Project Site.

2.2. PREPARATION

- 2.2.1. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- 2.2.2. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- 2.2.3. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- 2.2.4. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to

District per requirements of Document "Requests for Information." Include a detailed description of problem encountered, together with recommendations for any necessary changes to the Contract Documents.

2.3. CONSTRUCTION LAYOUT

- 2.3.1. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify District and its consultant promptly.
- 2.3.2. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
 - 2.3.2.1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2.3.2.2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 2.3.2.3. Inform installers of lines and levels to which they must comply.
 - 2.3.2.4. Check the location, level and plumb, of every major element as the Work progresses.
 - 2.3.2.5. Notify District and its consultant when deviations from required lines and levels exceed allowable tolerances.
 - 2.3.2.6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- 2.3.3. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- 2.3.4. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- 2.3.5. Record Log: Maintain a log of layout control Work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by District and its consultant.

2.4. FIELD ENGINEERING

- 2.4.1. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 2.4.1.1. Do not change or relocate existing benchmarks or control points without prior written approval of District and its consultant. Report lost or destroyed

permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to District and its consultant before proceeding.

- 2.4.1.2. Require surveyor to replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- 2.4.2. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project Site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 2.4.2.1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2.4.2.2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 2.4.2.3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- 2.4.3. Records: Contractor shall maintain a complete, accurate log of all control and survey Work as it progresses. On request of District or Architect, Contractor shall submit documentation to verify accuracy of field engineering Work at no additional cost to the District.
- 2.4.4. Certified Survey: On completion of foundation walls, major site improvements, and other Work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- 2.4.5. Final Property Survey: Prepare and submit a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey and are in conformance with Contract Documents.
 - 2.4.5.1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a Site corner to a legal point.
- 2.4.6. Compliance with Laws: Contractor is responsible for meeting all applicable codes, OSHA, safety, and shoring requirements.
- 2.4.7. Nonconforming Work: Contractor is responsible for any re-surveying required by correction of nonconforming Work.

2.5. INSTALLATION

- 2.5.1. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

- 2.5.1.1. Make vertical Work plumb and make horizontal Work level.
- 2.5.1.2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- 2.5.1.3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- 2.5.1.4. Maintain minimum headroom clearance of 7 feet in spaces without a suspended ceiling.
- 2.5.2. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- 2.5.3. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Completion.
- 2.5.4. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- 2.5.5. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels where possible.
- 2.5.6. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- 2.5.7. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 2.5.7.1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by District.
 - 2.5.7.2. Allow for building movement, including thermal expansion and contraction.
 - 2.5.7.3. Coordinate installation of anchorages. 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 such items to Project Site in time for installation.
- 2.5.8. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- 2.5.9. Hazardous Materials: Use products, cleaners, and installation materials that are not classed as hazardous per the MSDS sheets for the products where possible. If hazardous materials are necessary, inform District where and when they will be used no less than 48 hours before use. Take all recommended precautions of the materials' manufacturers to ensure safe use and clean-up.

2.6. DISTRICT-INSTALLED PRODUCTS

- 2.6.1. Site Access: Provide access to Project Site for District's construction forces.
- 2.6.2. Coordination: Coordinate construction and operations of the Work with work performed by District's construction forces.
 - 2.6.2.1. Construction Schedule: Inform District of Contractor's preferred schedule for District's portion of the Work. Adjust Construction Schedule based on a mutually agreeable timetable. Notify District if changes to schedule are required due to differences in actual construction progress.
 - 2.6.2.2. Preinstallation Conferences: Include District's construction forces at preinstallation conferences covering portions of the Work that are to receive District's work. Attend preinstallation conferences conducted by District's construction forces if portions of the Work depend on District's construction.

2.7. PROGRESS CLEANING

- 2.7.1. General: Clean Project Site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 2.7.1.1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2.7.1.2. Do not hold materials more than seven (7) days during normal weather or three (3) days if the temperature is expected to rise above 80 degrees F.
 - 2.7.1.3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations. Remove hazardous and unsanitary waste materials daily.
- 2.7.2. Site: Maintain Project Site free of waste materials and debris.
- 2.7.3. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 2.7.3.1. Remove liquid spills promptly.
 - 2.7.3.2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- 2.7.4. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- 2.7.5. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

- 2.7.6. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Completion.
- 2.7.7. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- 2.7.8. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Completion.
- 2.7.9. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- 2.7.10. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

2.8. STARTING AND ADJUSTING

- 2.8.1. Start equipment and operating components to confirm proper operation. Replace or repair malfunctioning units and retest.
- 2.8.2. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- 2.8.3. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- 2.8.4. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Document "Quality Requirements."

2.9. PROTECTION OF INSTALLED CONSTRUCTION

- 2.9.1. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Completion.
- 2.9.2. Comply with manufacturer's written instruction for temperature and relative humidity unless otherwise addressed in the construction planning, sequences, and instructions.

2.10. CORRECTION OF THE WORK

- 2.10.1. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Document "Cutting and Patching."
 - 2.10.1.1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

- 2.10.2. Restore permanent facilities used during construction to their specified condition.
- 2.10.3. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- 2.10.4. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- 2.10.5. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF DOCUMENT

DOCUMENT 01 73 10

CUTTING AND PATCHING

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions, including, without limitation, Inspector, Inspections, and Tests, Integration of Work, Nonconforming Work, and Correction of Work, and Uncovering Work;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Hazardous Materials Procedures and Requirements;
- 1.1.5. Hazardous Materials Certification;
- 1.1.6. Lead-Based Materials Certification; and
- 1.1.7. Imported Materials Certification.

1.2. CUTTING AND PATCHING

- 1.2.1. Contractor shall be responsible for all cutting, fitting, and patching, including associated excavation and backfill, required to complete the Work or to:
 - 1.2.1.1. Make several parts fit together properly.
 - 1.2.1.2. Uncover portions of Work to provide for installation of ill-timed Work.
 - 1.2.1.3. Remove and replace defective Work.
 - 1.2.1.4. Remove and replace Work not conforming to requirements of Contract Documents.
 - 1.2.1.5. Remove Samples of installed Work as specified for testing.
 - 1.2.1.6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.
 - 1.2.1.7. Attaching new materials to existing remodeling areas – including painting (or other finishes) to match existing conditions.
- 1.2.2. In addition to Contract requirements, upon written instructions from District, Contractor shall uncover Work to provide for observations of covered Work in accordance with the

Contract Documents, remove samples of installed materials for testing as directed by District, and remove Work to provide for alteration of existing Work.

- 1.2.3. Contractor shall not cut or alter Work, or any part of it, in such a way that endangers or compromises the integrity of the Work, the Project, or Work of others.
- 1.2.4. Contractor shall not cut and patch operating elements or safety related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - 1.2.4.1. Primary operational systems and equipment.
 - 1.2.4.2. Air or smoke barriers.
 - 1.2.4.3. Fire-suppression systems.
 - 1.2.4.4. Mechanical systems piping and ducts.
 - 1.2.4.5. Control systems.
 - 1.2.4.6. Communication systems.
 - 1.2.4.7. Conveying systems.
 - 1.2.4.8. Electrical wiring systems.
- 1.2.5. Contractor shall not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing capacity to perform as intended, or that results in increased maintenance or decreased operational life of safety. Miscellaneous elements include the following:
 - 1.2.5.1. Water, moisture or vapor barriers.
 - 1.2.5.2. Membranes and flashings.
 - 1.2.5.3. Exterior curtain-wall construction.
 - 1.2.5.4. Equipment supports.
 - 1.2.5.5. Piping, ductwork, vessels and equipment.
 - 1.2.5.6. Noise and vibration control elements and systems.
 - 1.2.5.7. Shoring, bracing and sheeting.

1.3. REQUEST TO CUT, ALTER, PATCH OR EXCAVATE

- 1.3.1. Contractor shall submit written notice to District pursuant to the applicable notice provisions of the Contract Documents, requesting consent to proceed with the cutting or alteration (“Request”) at least ten (10) days prior to any cutting or alterations that

may affect the structural safety of the Project, or Work of others, including the following:

- 1.3.1.1. The Work of the District or other trades.
- 1.3.1.2. Structural value or integrity of any element of the Project.
- 1.3.1.3. Integrity or effectiveness of weather-exposed or weather-resistant elements or systems.
- 1.3.1.4. Efficiency, operational life, maintenance or safety of operational elements.
- 1.3.1.5. Visual qualities of sight-exposed elements.

1.3.2. Contractor's Request shall also include:

- 1.3.2.1. Identification of the Project.
- 1.3.2.2. Description of affected Work.
- 1.3.2.3. Necessity for cutting, alterations, or excavations.
- 1.3.2.4. Impacts of that Work on the District, other trades, or structural or weatherproof integrity of the Project.
- 1.3.2.5. Description of proposed Work:
 - 1.3.2.5.1. Scope of cutting, patching, alterations, or excavations.
 - 1.3.2.5.2. Trades that will execute Work.
 - 1.3.2.5.3. Products proposed to be used.
 - 1.3.2.5.4. Extent of refinishing to be done.
- 1.3.2.6. Alternates to cutting and patching.
- 1.3.2.7. Cost proposal, when applicable.
- 1.3.2.8. The scheduled date the Work is to be performed and the duration of time to complete the Work.
- 1.3.2.9. Written permission of other trades whose Work will be affected.

1.4. QUALITY ASSURANCE

- 1.4.1. Contractor shall ensure that cutting, fitting, and patching shall achieve security, strength, weather protection, appearance for aesthetic match, efficiency, operational life, maintenance, safety of operational elements, and the continuity of existing fire ratings.

- 1.4.2. Contractor shall ensure that cutting, fitting, and patching shall successfully duplicate undisturbed adjacent profiles, materials, textures, finishes, and colors, and that materials shall match existing construction. Where there is dispute as to whether duplication is successful or has been achieved to a reasonable degree, the District's decision shall be final.

1.5. PAYMENT FOR COSTS

- 1.5.1. Costs caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of the District or its consultants including but not limited to the Architect, inspector(s), engineers, and agents, will be paid by Contractor and/or deducted from the Contract Price by the District.
- 1.5.2. Contractor shall provide written cost proposals prior to proceeding with cutting and patching. District shall only pay for cost of Work if it is part of the Contract Price or if a change has been made to the Contract in compliance with the provisions of the General Conditions. Cost of Work performed upon instructions from the District, other than defective or nonconforming Work, will be paid by District on approval of written Change Order in accordance with the Contract Documents.

2. PRODUCTS

2.1. MATERIALS

- 2.1.1. Contractor shall provide for replacement and restoration of Work removed. Contractor shall comply with the Contract Documents and with the industry standard(s), for the type of Work, and the Specification requirements for each specific product involved. If not specified, Contractor shall recommend a product of a manufacturer or appropriate trade association for approval by the District.
- 2.1.2. Materials to be cut and patched include those damaged by the performance of the Work.

3. EXECUTION

3.1. INSPECTION

- 3.1.1. Contractor shall inspect existing conditions of the Site and the Work, including elements subject to movement or damage during cutting and patching, excavating and backfilling. After uncovering Work, Contractor shall inspect conditions affecting installation of new products.
- 3.1.2. Contractor shall report unsatisfactory or questionable conditions in writing to District as indicated in the General Conditions and shall proceed with Work as indicated in the General Conditions by District.

3.2. PREPARATION

- 3.2.1. Contractor shall provide shoring, bracing and supports as required to maintain structural integrity for all portions of the Project, including all requirements of the Project.

- 3.2.2. Contractor shall provide devices and methods to protect other portions of Project from damage.
- 3.2.3. Contractor shall, provide all necessary protection from weather and extremes of temperature and humidity for the Project, including without limitation any work that may be exposed by cutting and patching Work. Contractor shall keep excavations free from water.

3.3. ERECTION, INSTALLATION AND APPLICATION

- 3.3.1. With respect to performance, Contractor shall ensure its Subcontractors:
 - 3.3.1.1. Execute fitting and adjustment of products to provide finished installation to comply with and match specified tolerances and finishes.
 - 3.3.1.2. Execute cutting and demolition by methods that will prevent damage to other Work, and provide proper surfaces to receive installation of repairs and new Work.
 - 3.3.1.3. Execute cutting, demolition excavating, and backfilling by methods that will prevent damage to other Work and damage from settlement.
 - 3.3.1.4. Contractor shall use original installer or fabricator to perform cutting and patching for:
 - 3.3.1.5. Weather-exposed surfaces and moisture-resistant elements such as roofing, sheet metal, sealants, waterproofing, and other trades.
 - 3.3.1.6. Sight-exposed finished surfaces.
- 3.3.2. Contractor shall ensure its Subcontractors execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes as shown or specified in the Contract Documents including, without limitation, the Drawings and Specifications.
- 3.3.3. Subcontractors shall fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Contractor shall conform to all Code requirements for penetrations or the Drawings and Specifications, whichever calls for a higher quality or more thorough requirement. Contractor shall maintain integrity of both rated and non-rated fire walls, ceilings, floors, etc.
- 3.3.4. Contractor's Subcontractors shall restore Work which has been cut or removed and install new products to provide completed Work in accordance with requirements of the Contract Documents and as required to match surrounding areas and surfaces.
- 3.3.5. Contractor's Subcontractors shall refinish all continuous surfaces to nearest intersection as necessary to match the existing finish to any new finish.

END OF DOCUMENT

DOCUMENT 01 77 00

CONTRACT CLOSEOUT AND FINAL CLEANING

1. GENERAL

1.1. RELATED DOCUMENTS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions including, without limitation, Documents on Work and Completion of Work;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Submittals;
- 1.1.5. Operation and Maintenance Data;
- 1.1.6. Warranties;
- 1.1.7. Record Documents;
- 1.1.8. Demonstration and Training; and
- 1.1.9. General Commissioning Requirements.

1.2. PRELIMINARY PROCEDURES

- 1.2.1. Before requesting inspection for determining date of Completion, complete the following. List items below that are incomplete in request.
 - 1.2.1.1. Prepare a list of items to be completed and corrected (“Punch List”), the value of items on the list, and reasons why the Work is not complete.
 - 1.2.1.2. Advise District of pending insurance changeover requirements.
 - 1.2.1.3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 1.2.1.4. Obtain and submit releases permitting District unrestricted use of the Work and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases, if required.
 - 1.2.1.5. Prepare and submit Project Record Documents, operation and maintenance manuals, Completion construction photograph prints and electronic files, damage or settlement surveys, property surveys, and similar final record information.

- 1.2.1.6. Deliver tools, spare parts, extra materials, and similar items to location designated by District. Label with manufacturer's name and model number where applicable.
- 1.2.1.7. Make final changeover of permanent locks and deliver keys to District. Advise District's personnel of changeover in security provisions.
- 1.2.1.8. Complete startup testing of systems.
- 1.2.1.9. Submit test/adjust/balance records.
- 1.2.1.10. Terminate and remove temporary facilities from Project Site, along with mockups, construction tools, and similar elements.
- 1.2.1.11. Advise District of changeover in heat and other utilities.
- 1.2.1.12. Submit changeover information related to District's occupancy, use, operation, and maintenance.
- 1.2.1.13. Complete final cleaning requirements, including touch-up painting.
- 1.2.1.14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

1.3. RECORD DOCUMENTS AND SHOP DRAWINGS

- 1.3.1. Contractor shall legibly mark each item to record actual construction, including:
 - 1.3.1.1. Measured depths of foundation in relation to finish floor datum.
 - 1.3.1.2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permit surface improvements.
 - 1.3.1.3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 1.3.1.4. Field changes of dimension and detail.
 - 1.3.1.5. Details not on original Contract Drawings
 - 1.3.1.6. Changes made by modification(s).
 - 1.3.1.7. References to related Shop Drawings and modifications.
 - 1.3.1.8. Contractor will provide one set of Record Drawings to District.
 - 1.3.1.9. Contractor shall submit all required documents to District and/or Architect prior to or with its final Application for Payment.

1.4. COMPLETION

- 1.4.1. Preliminary Procedures: Before requesting inspection for determining date of Completion, complete the following:

- 1.4.1.1. Submit a final Application for Payment according to the Contract Documents.
- 1.4.1.2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- 1.4.1.3. Submit pest-control final inspection report and warranty.
- 1.4.1.4. Instruction of District Personnel:
 - 1.4.1.4.1. Before final inspection, at agreed upon times, Contractor shall instruct District's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 - 1.4.1.4.2. For equipment requiring seasonal operation, Contractor shall perform instructions for other seasons within six (6) months.
 - 1.4.1.4.3. Contractor shall use operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
 - 1.4.1.4.4. Contractor shall prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.
 - 1.4.1.4.5. Contractor shall use operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- 1.4.2. Inspection: Submit a written request for inspection.
- 1.4.3. **LIST OF INCOMPLETE ITEMS (PUNCH LIST)** Contractor shall notify District and Architect when Contractor considers the Work complete. Upon notification, District and Architect will prepare a list of minor items to be completed or corrected ("Punch List").
- 1.4.4. Contractor and/or its Subcontractors shall proceed promptly to complete and correct items on the Punch List. Failure to include an item on Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.
- 1.4.5. Contractor shall comply with Punch List procedures as provided herein and in the Contract Documents, and maintain the presence of a Project Superintendent and Project Manager until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Contractor demobilize its forces prior to completion of the Punch List. Upon receipt of Contractor's written notice that all of the Punch List items have been fully completed and the Work is ready for final inspection and acceptance, District and Architect will inspect the Work and shall submit to Contractor a final inspection report noting the Work, if any, required in order to reach Completion in accordance with the Contract Documents. Absent unusual

circumstances, this report shall consist of the Punch List items not yet satisfactorily completed and any additional Punch List items not originally included.

- 1.4.6. Upon Contractor's completion of all items on the Punch List and any other uncompleted portions of the Work, the Contractor shall notify the District and Architect, who shall again inspect such Work. If the District and Architect find the Work complete and acceptable under the Contract Documents, the District will notify Contractor, who shall then jointly submit to the Architect and District its final Application for Payment.
- 1.4.7. **Costs of Multiple Inspections.** More than two (2) requests of District to make a final inspection shall be considered an additional service of District, the Architect and/or the Inspector, and all subsequent costs will be invoiced to Contractor and withheld from remaining payments, if funds are available.
- 1.4.8. Punch List shall be deemed complete only upon the District's determination that all items on the Punch List, and all updates to the Punch List, are complete.

1.5. WARRANTIES

- 1.5.1. Submittal Time: Submit written warranties on request of District for designated portions of the Work where commencement of warranties other than date of Completion is indicated.
- 1.5.2. Organize warranty documents into an orderly sequence as required by the Division 01 Document "Warranties."

2. PRODUCTS

2.1. MATERIALS

- 2.1.1. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

3. EXECUTION

3.1. FINAL CLEANING

- 3.1.1. Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Contractor shall use cleaning methods and procedures that reduce the overall impact on human health and the natural environment by reducing the amount of disposed waste, pollution and environmental degradation. If Project is subject to LEED certification, Contractor shall ensure compliance with the applicable LEED requirements for final cleaning of the Site.
- 3.1.2. Contractor shall employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program.
 - 3.1.2.1. Complete the following cleaning operations before requesting final inspection:

- 3.1.2.1.1. Clean Project Site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
- 3.1.2.1.2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
- 3.1.2.1.3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
- 3.1.2.1.4. Remove tools, construction equipment, machinery, and surplus material from Project Site.
- 3.1.2.1.5. Remove snow and ice to provide safe access to building.
- 3.1.2.1.6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- 3.1.2.1.7. Clean all surfaces and other work in accordance with recommendations of the manufacturer.
- 3.1.2.1.8. Remove spots, mortar, plaster, soil, and paint from ceramic tile, stone, and other finish materials.
- 3.1.2.1.9. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- 3.1.2.1.10. Sweep concrete floors broom clean in unoccupied spaces.
- 3.1.2.1.11. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
- 3.1.2.1.12. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
- 3.1.2.1.13. Remove labels that are not permanent.
- 3.1.2.1.14. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 3.1.2.1.14.1. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

- 3.1.2.1.15. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - 3.1.2.1.16. Replace parts subject to unusual operating conditions.
 - 3.1.2.1.17. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - 3.1.2.1.18. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - 3.1.2.1.19. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - 3.1.2.1.20. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - 3.1.2.1.21. Leave Project Site clean and ready for occupancy.
- 3.1.3. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests.
- 3.1.4. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on District's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project Site and dispose of lawfully.

END OF DOCUMENT

DOCUMENT 01 78 23

OPERATION AND MAINTENANCE DATA

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions, including, without limitation, Completion of the Work;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Submittals;
- 1.1.5. Contract Closeout and Final Cleaning;
- 1.1.6. Warranties;
- 1.1.7. Record Documents;
- 1.1.8. General Commissioning Requirements.

1.2. QUALITY ASSURANCE

- 1.2.1. Contractor shall prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.3. FORMAT

- 1.3.1. Contractor shall prepare data in the form of an instructional manual entitled "OPERATIONS AND MAINTENANCE MANUAL & INSTRUCTIONS" ("Manual").
- 1.3.2. Binders: Contractor shall use commercial quality, 8-1/2 by 11 inch, three-side rings, with durable plastic covers; two inch maximum ring size. When multiple binders are used, Contractor shall correlate data into related consistent groupings.
- 1.3.3. Cover: Contractor shall identify each binder with typed or printed title "OPERATION AND MAINTENANCE MANUAL & INSTRUCTIONS"; and shall list title of Project and identify subject matter of contents.
- 1.3.4. Contractor shall arrange content by systems process flow under section numbers and sequence of the Table of Contents of the Contract Documents.
- 1.3.5. Contractor shall provide tabbed fly leaf for each separate Product and system, with typed description of Product and major component parts of equipment.

- 1.3.6. Text: The content shall include Manufacturer's printed data, or typewritten data on 24 pound paper.
- 1.3.7. Drawings: Contractor shall provide with reinforced punched binder tab and shall bind in with text; folding larger drawings to size of text pages.

1.4. CONTENTS, EACH VOLUME

- 1.4.1. Table of Contents: Contractor shall provide title of Project; names, addresses, and telephone numbers of the Architect, any engineers, subconsultants, Subcontractor(s), and Contractor with name of responsible parties; and schedule of Products and systems, indexed to content of the volume.
- 1.4.2. For Each Product or System: Contractor shall list names, addresses, and telephone numbers of Subcontractor(s) and suppliers, including local source of supplies and replacement parts.
- 1.4.3. Product Data: Contractor shall mark each sheet to clearly identify specific Products and component parts, and data applicable to installation. Delete inapplicable information.
- 1.4.4. Drawings: Contractor shall supplement Product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Contractor shall not use Project Record Documents as maintenance drawings.
- 1.4.5. Text: The Contractor shall include any and all information as required to supplement Product data. Contractor shall provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.5. MANUAL FOR MATERIALS AND FINISHES

- 1.5.1. Building Products, Applied Materials, and Finishes: Contractor shall include Product data, with catalog number, size, composition, and color and texture designations. Contractor shall provide information for re-ordering custom manufactured Products.
- 1.5.2. Instructions for Care and Maintenance: Contractor shall include Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- 1.5.3. Moisture Protection and Weather Exposed Products: Contractor shall include Product data listing applicable reference standards, chemical composition, and details of installation. Contractor shall provide recommendations for inspections, maintenance, and repair.
- 1.5.4. Additional Requirements: Contractor shall include all additional requirements as specified in the Specifications.
- 1.5.5. Contractor shall provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.6. MANUAL FOR EQUIPMENT AND SYSTEMS

- 1.6.1. Each Item of Equipment and Each System: Contractor shall include description of unit or system, and component parts and identify function, normal operating characteristics, and limiting conditions. Contractor shall include performance curves, with engineering data and tests, and complete nomenclature, and commercial number of replaceable parts.
- 1.6.2. Panelboard Circuit Directories: Contractor shall provide electrical service characteristics, controls, and communications.
- 1.6.3. Contractor shall include color coded wiring diagrams as installed.
- 1.6.4. Operating Procedures: Contractor shall include start-up, break-in, and routine normal operating instructions and sequences. Contractor shall include regulation, control, stopping, shut-down, and emergency instructions. Contractor shall include summer, winter, and any special operating instructions.
- 1.6.5. Maintenance Requirements: Contractor shall include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- 1.6.6. Contractor shall provide servicing and lubrication schedule, and list of lubricants required.
- 1.6.7. Contractor shall include manufacturer's printed operation and maintenance instructions.
- 1.6.8. Contractor shall include sequence of operation by controls manufacturer.
- 1.6.9. Contractor shall provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- 1.6.10. Contractor shall provide control diagrams by controls manufacturer as installed.
- 1.6.11. Contractor shall provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- 1.6.12. Contractor shall provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- 1.6.13. Contractor shall provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- 1.6.14. Additional Requirements: Contractor shall include all additional requirements as specified in Specification(s).
- 1.6.15. Contractor shall provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.7. SUBMITTAL

- 1.7.1. Concurrent with the Schedule of Submittals as indicated in the General Conditions, Contractor shall submit to the District for review two (2) copies of a preliminary draft of proposed formats and outlines of the contents of the Manual.
- 1.7.2. For equipment, or component parts of equipment put into service during construction and to be operated by District, Contractor shall submit draft content for that portion of the Manual within ten (10) days after acceptance of that equipment or component.
- 1.7.3. On or before the Contractor submits its final application for payment, Contractor shall submit two (2) copies of a complete Manual in final form. The District will provide comments to Contractor and Contractor must revise the content of the Manual as required by District prior to District's approval of Contractor's final Application for Payment.
- 1.7.4. Contractor must submit two (2) copies of revised Manual in final form within ten (10) days after receiving District's comments. Failure to do so will be a basis for the District withholding funds sufficient to protect itself for Contractor's failure to provide a final Manual to the District.

END OF DOCUMENT

DOCUMENT 01 78 36

WARRANTIES

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions, including, without limitation, Warranty/Guarantee/Indemnity;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Submittals;
- 1.1.5. Contract Closeout and Final Cleaning;
- 1.1.6. Operation and Maintenance Data;
- 1.1.7. Record Documents;
- 1.1.8. General Commissioning Requirements.

1.2. FORMAT

- 1.2.1. Binders: Contractor shall use commercial quality, 8-1/2 by 11 inch, three-side rings, with durable plastic covers; two inch maximum ring size.
- 1.2.2. Cover: Contractor shall identify each binder with typed or printed title "WARRANTIES" and shall list the title of Project.
- 1.2.3. Table of Contents: Contractor shall provide the title of Project; name, address, and telephone number of Contractor and equipment supplier, and name of responsible principal. Contractor shall identify each item with the number and title of the specific Specification, document, provision, or section in which the name of the Product or Work item is specified.
- 1.2.4. Contractor shall separate each Warranty with index tab sheets keyed to the Table of Contents listing, providing full information and using separate typed sheets as necessary. Contractor shall list each applicable and/or responsible Subcontractor(s), supplier(s), and/or manufacturer(s), with name, address, and telephone number of each responsible principal(s).
- 1.2.5. In addition to all Warranty documentation and information required herein, Contractor shall provide its Guarantee as required by the Contract Documents.

1.3. PREPARATION

- 1.3.1. Contractor shall obtain Warranties, executed in duplicate by each applicable and/or responsible Subcontractor(s), supplier(s), and manufacturer(s), within ten (10) days after completion of the applicable item or Work. Except for items put into use with District's permission, Contractor shall leave date of beginning of time of Warranty until the date of Completion is determined.
- 1.3.2. Contractor shall verify that Warranties.
- 1.3.3. are in proper form, contain full information, and are notarized, when required.
- 1.3.4. Contractor shall co-execute submittals when required.
- 1.3.5. Contractor shall retain warranties until time specified for submittal.

1.4. TIME OF SUBMITTALS

- 1.4.1. Schedule of Warranties. Contractor shall provide District with a Schedule of Warranties at least fourteen (14) days prior to submitting its other required submittals indicated herein. This will provide District the opportunity to review the anticipated Warranties and make any comments, suggestions or revisions the District may require.
- 1.4.2. For equipment or component parts of equipment put into service during construction with District's permission, Contractor shall submit a draft Warranty for that equipment or component within ten (10) days after acceptance of that equipment or component.
- 1.4.3. On or before the Contractor submits its final application for payment, Contractor shall submit all Warranties and related documents in final form. The District shall indicate any Warranty-related Work that is being performed and incomplete at the time Contractor submits its final application for payment. District will provide comments to Contractor and Contractor must revise the content of the Warranties as required by District prior to District's approval of Contractor's final Application for Payment.
- 1.4.4. For items of Work that are not completed until after the date of Completion, Contractor shall provide an updated Warranty for those item(s) of Work within ten (10) days after acceptance, listing the date of acceptance as start of the Warranty period.

END OF DOCUMENT

DOCUMENT 01 78 39

RECORD DOCUMENTS

1. GENERAL

1.1. RELATED DOCUMENTS AND PROVISIONS

Contractor shall review all Contract Documents for applicable provisions related to the provisions in this document, including without limitation:

- 1.1.1. General Conditions, including, without limitation, Documents on Work and Completion of Work;
- 1.1.2. Special Conditions (if any);
- 1.1.3. Supplemental Conditions (if any);
- 1.1.4. Submittals;
- 1.1.5. Contract Closeout and Final Cleaning;
- 1.1.6. Operation and Maintenance Data;
- 1.1.7. Warranties;
- 1.1.8. General Commissioning Requirements.

2. RECORD DOCUMENTS OR DRAWINGS

2.1. GENERAL

- 2.1.1. "Record Documents" and "Record Drawings" may also be referred to in the Contract Documents as "As-Built Drawings."
- 2.1.2. As indicated in the Contract Documents, District will provide Contractor with one set of reproducible plans of the original Drawings.
- 2.1.3. Contractor shall maintain at each Project Site one (1) set of marked-up Drawings and shall transfer all changes and information to those marked-up Drawings, as often as required in the Contract Documents, but in no case less than once each month. Contractor shall submit to the Project Inspector one set of reproducible vellums of the Project Record Documents ("As-Builts") showing all changes incorporated into the Work since the preceding monthly submittal. The As-Builts shall be available at the Project Site. The Contractor shall submit reproducible vellums at the conclusion of the Project following review of the blue line prints.
- 2.1.4. Label and date each Record Document "RECORD DOCUMENT" in legibly printed letters.
- 2.1.5. All deviations in construction, including but not limited to pipe and conduit locations and deviations caused, without limitation, by Change Orders, Construction Directives, RFI's, and Addenda shall be accurately and legibly recorded by Contractor.

- 2.1.6. Locations and changes shall be done by Contractor in a neat and legible manner and, where applicable, indicated by drawing a "cloud" around the changed or additional information.

2.2. **RECORD DOCUMENT INFORMATION**

- 2.2.1. Contractor shall record the following information:
 - 2.2.1.1. Locations of Work buried under or outside each building, including, without limitation, all utilities, plumbing and electrical lines, and conduits.
 - 2.2.1.2. Actual numbering of each electrical circuit.
 - 2.2.1.3. Locations of significant Work concealed inside each building whose general locations are changed from those shown on the Drawings.
 - 2.2.1.4. Locations of all items, not necessarily concealed, which vary from the Contract Documents.
 - 2.2.1.5. Installed location of all cathodic protection anodes.
 - 2.2.1.6. Deviations from the sizes, locations, and other features of installations shown in the Contract Documents.
 - 2.2.1.7. Locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stubouts, invert elevations, etc.
 - 2.2.1.8. Sufficient information to locate Work concealed in each building with reasonable ease and accuracy.
- 2.2.2. In some instances, this information may be recorded by dimension. In other instances, it may be recorded in relation to the spaces in the building near which it was installed.
- 2.2.3. Contractor shall provide additional Drawings as necessary for clarification.
- 2.2.4. Contractor shall provide in an electronic format as indicated in the Contract Documents, a copy of the Drawings, made from final Shop Drawings marked "No Exceptions Taken" or "Approved as Noted."
 - 2.2.4.1. With the District's prior approval, Contractor may provide these reproducible Drawings in hard copy.

3. **RECORD MATERIALS LOG**

- 3.1.1. Materials Log shall be submitted prior to Completion.
- 3.1.2. Preparation: Mark Material Log to indicate the actual product installation where installation varies from that indicated in original Material Log.

- 3.1.3. Give particular attention to information on concealed materials and installations that cannot be readily identified and recorded later.
- 3.1.4. Mark copy with the proprietary name and characteristics of products, materials, and equipment furnished, including substitutions and product options selected.
- 3.1.5. Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
- 3.1.6. The working copy of Materials Log shall be consistently maintained throughout construction, and shall be accessible at Project Site.

4. MAINTENANCE OF RECORD DOCUMENTS

- 4.1. Contractor shall store Record Documents apart from documents used for construction as follows:
 - 4.1.1. Provide files and racks for storage of Record Documents.
 - 4.1.2. Maintain Record Documents in a clean, dry, legible condition and in good order.
- 4.2. Contractor shall not use Record Documents for construction purposes.

END OF DOCUMENT

SECTION 02 20 00
EARTHWORK FOR BUILDINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

- 1. Preparing and grading subgrades for slabs-on-grade within the limits of the building structure.
 - 2. Excavating and backfilling for the new building.
 - 3. Import and export of earth fill material.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Division 2 Section "Earthwork For Civil" for work outside the limits of the buildings.
 - 2. Division 3 Section "Cast-In-Place Concrete" for sand cushion under slabs.

1.3 DEFINITIONS

- A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- D. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.
- E. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

- F. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Samples: 20 lb samples, sealed in airtight containers, of each proposed fill and backfill soil material from borrow sources. The Geotechnical Engineer shall approve import soils.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.
- B. Testing and Inspection Service: Owner will employ a qualified independent Geotechnical Engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings". Before commencing earthwork, meet with representatives of the governing authorities, Owner, Architect, consultants, Geotechnical Engineer, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least three (3) working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
- D. A Geotechnical Report has not been prepared for this project. The report is not a required submittal due to the project size.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted in writing by the Architect and then only after acceptable temporary utility services have been provided. Provide a minimum 48-hours notice to the Architect and receive written notice to proceed before interrupting any utility.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shutoff services if lines are active.
- C. Visit the site to become familiar with existing site conditions and the contents of the data presented in the soil investigation report. The Contractor shall make his own interpretation of the data contained in the report and shall not be relieved of liability under the contract for any loss he may sustain as a result of any variance between conditions indicated by or deduced from the report and the actual conditions encountered during the progress of the work.

- D. The existing grades as shown on the Drawings are approximate only. The Contractor shall accept the site as it exists prior to the start of construction and shall do all grading work necessary to accomplish the finish grades shown on the Drawings.
- E. Materials are assumed to be earth and material that can be worked with ordinary earthmoving equipment. If rock is encountered within the limits of the construction, adjustments will be made in the contract in accordance with the Owner's Representative's instructions. Rock is defined as any stone or boulder that cannot be removed with power equipment without using explosives.
- F. All known obstructions have been noted on the drawings. However, should active, inactive, or abandoned sewers, water piping, or other underground utilities or other obstructions be encountered which interfere with the work, relocate, cap off, or remove at Owner's expense in accordance with the Owner's Representative before work proceeds excepting that in an emergency affecting safety of life, work, or adjoining property, act at once without instructions to prevent injury or loss. If any utilities are the property of others than the Owner, notify and secure written consents from the party supplying and those receiving said service to proceed accordingly. At completion of work, turn over such consents to the Owner's Representative.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations. Import earth fill material shall be coarse grained (ASTM D 2488), nonexpansive soil having an Expansion Index no greater than 10 (ASTM D4829) and with sufficient binder to be stable in foundation and utility excavations and maintain specified elevation tolerances during paving operations.
- B. Satisfactory Soil Materials: ASTM D2487 soil classification groups GM, GC, SW, SP, SC and SM (ASTM D 2488); free of rock or gravel larger than 3 inches in any dimension, debris, waste, vegetation and other deleterious matter.
- C. Unsatisfactory Soil Materials: ASTM D2487 soil classification groups CL, CH, ML, MH, and PT. If encountered during grading, these soils should be removed from construction areas unless specifically approved by the Geotechnical Engineer. Materials may be blended with satisfactory soil materials if authorized by the Geotechnical Engineer.
- D. Backfill and Fill Materials: Geotechnical Engineer shall approve soil materials used as fill or backfill. Onsite materials used as fill should be free from organic material, hazardous materials, unsuitable fill debris and other deleterious substances. Fill material shall not contain rocks, blocky material, or lumps over 3 inches in maximum dimension, nor more than 15 percent material larger than 2 inches. The use of on-site soil shall be approved by the Geotechnical Engineer.
- E. Retaining Wall Backfill: Clean course sand or gravel as approved by geotechnical engineer.

- F. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1½ inch sieve and not more than 5 percent passing a No. 8 sieve.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.
- B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick minimum, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep.
 - 1. Tape Colors: Provide tape colors to utilities as follows:
 - a. Red: Electric.
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Tree protection is specified in the Division 2 Section "Protection of Existing Improvements".

3.2 DEWATERING

- A. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. The potential exists that water could be encountered during excavation. Refer to the Soils Engineering Report for site conditions and preliminary recommendations. If wet soils are encountered within the excavation, design and provide a de-watering system to mitigate the wet soil conditions.
- B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.3 EXCAVATION

- A. Explosives: Do not use explosives.
- B. Unclassified Excavation: Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

3.4 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1.2 inches. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.
- B. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 APPROVAL OF SUBGRADE

- A. Notify Geotechnical Engineer when excavations have reached required subgrade.
- B. When Geotechnical Engineer determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect. Fill unauthorized excavations under other construction as directed by the Architect.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials in areas designated by Architect. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 1. Acceptance of construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for record documents.
 3. Testing, inspecting, and approval of underground utilities.
 4. Concrete formwork removal.
 5. Removal of trash and debris from excavation.
 6. Removal of temporary shoring and bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.10 FILL

- A. Preparation: Remove existing concrete, asphalt paving, vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills. Extend the excavation according to the plan.
 - 1. Bench sloped surfaces steeper than 1 vertical to 5 horizontal so fill material will bond with existing surface. Perform benching in a manner that at least the upper 2 feet of existing slope, as measured from the face of the slope is removed.
 - 2. The Geotechnical Engineer shall inspect the surface of the ground to receive fill before fill is placed. No fill shall be placed until this surface has been approved by Geotechnical Engineer.

- B. When relative compaction tests indicate that fill densities are less than specified, the area should be reworked and retested. Scarify, moisture condition, and compact until retests indicate the minimum compaction densities have been achieved.

3.11 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to at least optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy.
 - 2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density. Stockpile or spread and dry removed wet satisfactory soil material.

3.12 COMPACTION

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of the structure.

- C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D1557.
 - 1. Under structures, building slabs, and steps, compact fill material to a minimum of 90 percent maximum dry density.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Grading Inside Building Lines: Finish subgrade to a tolerance of ½ inch when tested with a 10 foot straightedge.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
 - 1. Perform field in-place density tests according to ASTM 1556 (sand cone method), ASTM D 2167 (rubber balloon method), ASTM D2937 (drive cylinder method), or ASTM D2922 (nuclear method). If ASTM D2922 is used, nuclear gages should be periodically calibrated in accordance with ASTM D3017.
 - 2. Footing Subgrade: Verification and approval of footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Architect.
 - 3. Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2000 sq. ft. (per each lift) or less of paved area or building slab, but in no case fewer than three tests.
 - 4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.
- B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.
- C. The owner's Geotechnical Engineer shall submit verified reports on form DSA-293.

3.15 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, and erosion. Keep free of trash and debris.

- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace material to depth directed by the Architect; reshape and recompact at optimum moisture content to the required density.

- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

3.17 DUST CONTROL

- A. The contractor shall provide for dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area of offsite if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the contractor leaves the site.

END OF SECTION 02-20-00

SECTION 02 23 00 - SITE CLEARING

PART 1 - GENERAL

1.1 Description

- A. Work included: Clear and grub the site as shown on the Drawings and specified herein.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 02 41 16 Building Demolition

1.2 Quality Assurance

- A. Re-adjust work performed that does not meet technical or design requirements, but make no deviation from the contract documents without specific and written approval from the Architect.
- B. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 Product Handling

- A. Comply with pertinent provisions of Division 1 of these Specifications for Product Requirements.

PART 2 - PRODUCTS

2.1 Materials

- A. Provide materials not specifically described but required for proper completion of the work of this Section as selected by the Contractor subject to the approval of the Architect.
- B. Herbicide – Provide a dry, free-flowing, dust-free chemical compound, soluble in water, capable of inhibiting growth of vegetation, and approved for use on this work by governmental agencies having jurisdiction and the Architect.

PART 3 - EXECUTION

3.1 Surface Conditions

- A. A.Verification of conditions:
 - 1. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
 - 2. Execution of work under this specification section shall constitute acceptance of existing conditions.
 - 3. Obtain all necessary permits and authorizations by regulatory agencies required to perform the Work under this Section.
 - 4. Verify that utilities have been disconnected and capped before starting selective demolition operations.
 - 5. Record existing conditions by use of Pre-demolition Photographs.
 - a. Inventory and record the condition of items to be salvaged and/or re-installed.
- B. Correct conditions detrimental to timely and proper execution of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 Protection

- A. Protect existing utilities indicated or made known.
- B. Protect trees and shrubs, where indicated to remain, by providing a fence around the tree or shrub a sufficient distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this work.
- C. Protection of persons and property:
 - 1. Barricade open depressions and holes occurring as part of this work, and post warning lights on property adjacent to or within public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, Lateral movement, undermining, washout, and other hazards created by operations under this Section.
- D. Use means necessary to prevent dust from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.3 Clearing

- A. Clearing and Grubbing
1. Remove all surface rocks, debris, trash, tree stumps, roots, and other vegetation within the extent of construction as indicated by the drawings. Do not remove vegetation in other areas.
 2. Fell trees, dispose of the trees and other vegetation designated for removal, together with the downed timber, snags, brush, wood, rocks, weeds grass and rubbish. Contractor shall provide a qualified professional tree surgeon to trim individual trees designated to be left standing within the cleared areas of all dead branches and of all live branches to such heights and in such manner as are indicated on the drawings or approved by the Architect. All limbs, branches and roots damaged during construction, together with those required to be trimmed, shall be neatly cut next to the hole of the tree or main branch or root. Cuts more than 1" diameter thus made and any injury to the tree trunk or main branches shall be immediately painted with tree wound paint.
 3. Grub soils to a depth adequate to remove all deleterious material from the working area of the site.
 4. Refer to drawings for trees and shrubs to be removed. Protect certain trees as indicated.
 - a. Remove tops, trunks, and roots of trees and shrubs to a minimum depth of 3 feet or to a depth required to remove all roots.
 - b. Chip removed trees, shrubs, and roots. .
 - 1) Removed chipped material to recycling station.
 5. Do not leave any root greater than one inch in diameter and larger in the ground to a depth of at least 12" below the existing ground surface or subgrade or the new graded surface, whichever is lower except as specifically approved by the Engineer. Treat roots remaining in the soil with an herbicide approved by the Architect.
 6. At building pads, site improvements, or trenching, strip topsoil which contains:
 - a. Grass, weeds, and natural vegetation to a minimum depth of 12 inches.
 - b. Stumps and roots 1/4 inch and larger.
- B. Removal of Debris: Remove all debris from the site in a legal manner and leave the site in a neat and orderly condition subject to the approval of the Owner. Do not store or permit debris to accumulate on the job site.

3.4 Disposal

- A. General:
1. Remove brush, grass, roots, trash, and other material from clearing operations.
 2. Dispose of away from the site in a legal manner.
 3. Do not store or permit debris to accumulate on the job site.

4. Do not burn debris at the site.

3.5 Dust Control

- A. At the contractor's expense, use chemical palliative or spread water as required to maintain strict control of dust generated by operation of work under this Section.

3.6 Clean-Up

- A. Maintain cleanliness on roadways and other public area used by equipment. Contractor will be held responsible for immediate removal of all spillage on these paving areas. Remove from the Project Site all rubbish, rubble, and debris found thereon and all materials and debris resulting from demolition, leaving site in a safe and clean condition.

END OF SECTION 02 32 00

SECTION 02 41 16 - BUILDING DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Demolition of designated structures and removal of materials from site.
- B. Demolition and removal of foundations and slabs-on-grade where indicated.
- C. Disconnecting and capping removal of identified utilities where indicated.
- D. Removal of underground piping where indicated.
- E. Salvage, storage, and turnover of items to be retained by [Owner] [District].
- F. Temporary fire protection.
- G. Coordination with hazardous waste removal.

1.2 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for demolition of structures, safety of adjacent structures, dust control and disposal of materials.
- B. Comply with 2022 California Fire Code (CFC), California Code of Regulations, (CCR) Title 24, Part 9, Chapter 33 - Fire Safety During Construction and Demolition.
- C. Obtain required permits from authorities having jurisdiction.
- D. Notify affected utility companies before starting Work and comply with their requirements.
- E. Do not close or obstruct roadways, sidewalks, and hydrants without permits.
- F. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

1.3 SUBMITTALS

- A. Predemolition Photographs: Show conditions of existing adjacent construction and site improvements that might be misconstrued as damaged by demolition operations. Submit before Work begins.
- B. Record Documents: Submit under provisions of Section 01 70 00. Accurately record locations of utilities and subsurface obstructions on Record Drawings.
- C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for removing refrigerant, stating that refrigerant recovery was performed according to EPA regulations. Include name and address of technician and date of recovery.

1.4 QUALITY ASSURANCE

- A. Demolition Firm: Experienced firm that specializes in demolition similar to extent indicated for this Project.
- B. Refrigerant Recovery Technician: Certified by EPA – approved certification program.

1.5 PROJECT CONDITIONS

- A. Buildings to be demolished will be evacuated and their use discontinued before start of Work.
 - B. District will occupy building(s) adjacent to demolition area. Conduct demolition so District's operation will not be disrupted.
 - C. Provide at least 72 hours notice to District of activities that will affect District's operation.
 - D. Maintain access to existing walkways, exits, and other adjacent occupied facilities.
 - E. District assumes no responsibility for buildings and structures to be demolished
 - F. Hazardous Materials: It is not anticipated that hazardous materials will be encountered in the Work.
1. Hazardous materials will be removed by District before start of Work.

2. If materials suspected of containing hazardous materials are encountered, do not disturb. Notify Architect immediately.
3. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
4. Hazardous materials will be removed by District under separate contract.

1.6 SCHEDULING

- A. Schedule Work under the provisions of Section 01 32 16.
- B. Perform Work during normal hours of operation.

PART 2 - PRODUCTS

2.1 N/A

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Correlate existing conditions with requirements indicated.
- B. Inventory and record condition of items to be removed and salvaged.
- C. Execute predemolition photographs.

3.2 PREPARATION

- A. Provide, erect, and maintain temporary barriers and security devices under provisions of Section 01 50 00.
- B. Protect existing landscaping materials, appurtenances, and structures which are not to be demolished.
- C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.

- D. Mark location of utilities.

3.3 DEMOLITION REQUIREMENTS

- A. Conduct demolition to minimize interference with adjacent structures and occupancies.
- B. Cease operations immediately if adjacent structures appear to be in danger. Notify Architect. Do not resume operations until directed.
- C. Conduct operations with minimum interference to public accesses. Maintain egress and access at all times.
- D. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property.
- E. Sprinkle Work with water to minimize dust. Provide hoses and water connections for this purpose.
- F. Maintain fire safety during demolition in accordance with CFC, Article 87, Section 8706.

3.4 DEMOLITION

- A. Disconnect, cap, and identify designated utilities within demolition areas.
- B. Remove foundation walls and footings.
- C. Remove concrete slabs and asphalt paving.
- D. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect in accordance with requirements of Section 01 66 10.
- E. Backfill open pits and holes caused as a result of demolition.
- F. Rough grade and compact areas affected by demolition to maintain site grades and contours.
- G. Remove demolished materials from site and dispose of legally.

- H. Do not burn or bury materials on site. Leave site in clean condition.
- I. Remove temporary Work.

3.5 RECYCLING OF DEMOLITION MATERIALS

- A. Separate recycled demolition materials from other demolished materials.
- B. Stockpile processed materials on-site without intermixing with other materials.
- C. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- D. Do not store materials within drip line of trees.
- E. Transport recyclable materials that are not indicated to be reused off District's property to recycling receiver or processor.
- F. Recycled incentives received for building demolition materials shall be equally shared between Contractor and District.
- G. Concrete: Break up and transport to concrete-recycling facility.
- H. Concrete Reinforcement: Remove reinforcement from concrete and sort with other metals.
- I. Masonry: Crush masonry and screen to comply with requirements in Division 2 for use as satisfactory soil for fill or subbase.
 - J. Masonry Reinforcement: Remove reinforcement from masonry and sort with other metals.
 - K. Wood Materials: Sort and stack members according to size, type, and length. Separate dimensional and engineered lumber, panel products, and treated wood materials.
 - L. Metals: Separate by metal type, Remove nuts, bolts, and rough hardware. Sort structural steel by type and size.

- M. Roofing: Separate organic and fiberglass shingles and felts. Remove nails, staples, and accessories.
- N. Doors and Hardware: Brace open end of door frames. Leave hardware attached to doors.
- O. Carpet and Pad: Store clean dry carpet and pad in closed container or trailer.
- P. Gypsum Board: Stack large clean pieces on pallets. Remove edge trim and sort with metals. Remove and dispose of fasteners.
- Q. Acoustical Ceiling Materials: Stack panels and tiles on pallets. Separate suspension system and sort with metals.
- R. Equipment: Drain tanks, piping and fixtures. Seal openings with caps or plugs.
- S. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, and other components.
- T. Lighting Fixtures: Remove lamps and separate by type.
- U. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type and size.
- V. Conduit: Reduce conduit to straight lengths and store by type and size.

3.6 SALVAGING OF DEMOLITION MATERIALS

- A. Clean salvaged items.
- B. Pack or crate items after cleaning. Identify contents.
- C. Store items in secure area until delivery to District.
- D. Protect items from damage.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Except for items to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain, remove demolished materials from Project Site and legally dispose of them in an EPA-approved landfill.

- B. Do not burn or bury materials on site.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition.
- B. Return adjacent areas to condition existing before demolition operations began.
- C. Leave site in a clean condition.
- D. Items to be removed and be retained by District. Contractor shall notify the District Representative if any of the scheduled items are to be removed in the course of demolition and remodeling. District shall, within 48 hours, notify Contractor as to which of the items below are to be treated as salvage, and to what District location they should be delivered, and shall have the necessary staff and equipment available at that site to unload these items.
 - 1. Toilets.
 - 2. Urinals.
 - 3. Flush valves
 - 4. Doors.
 - 5. Door hardware.
 - 6. Air compressors.
 - 7. Late model classroom unit heater assemblies.
 - 8. Rooftop units.
 - 9. Low Voltage components.

END OF SECTION

SECTION 03 10 00
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in-place concrete formwork for buildings.
- B. Related Sections include the following:
 - 1. Division 3 Section "Concrete Reinforcing".
 - 2. Division 3 Section "Cast-in-Place Concrete".
- C. Design responsibility: designing formwork for structural stability and efficiency is contractor's responsibility.

1.3 QUALITY ASSURANCE

- A. ACI Publications: Comply with the following unless modified by the Contract Documents.
 - 1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 - 2. ACI 347, "Recommended Practice for Concrete Formwork."

PART 2 - PRODUCTS

2.1 FORM -FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, $\frac{3}{4}$ by $\frac{3}{4}$ inch minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

- B. Construct formwork so concrete member and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.

- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.

- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely

braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- M. Foundation concrete may be placed directly into neat excavations provided foundation trench walls are stable as determined by the Architect. In such case, the minimum formwork shown on the drawings is mandatory to insure clean excavations immediately prior to and during the placing of concrete.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns and similar parts of Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and re-shoring.
- B. Plan sequence of removal of shores and re-shore to avoid damage to concrete. Locate and provide adequate re-shoring to support construction without excessive stress or deflection.

END OF SECTION 03-10-00

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in place concrete reinforcing, and placement procedures for buildings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 3 Section "Concrete Formwork".
 - 2. Division 3 Section "Cast-in-Place Concrete".
 - 3. Division 4 Section " Unit Masonry Assemblies" for CMU wall reinforcing.
- C. Additional reinforcing steel: In addition to the reinforcing steel shown on the drawings, provide 500 pounds of reinforcing to be installed at no additional cost to the contract as directed by the Structural Engineer.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Reinforcing Bars: Where samples are taken from bundles as deliver from the mill, with the bundles indentified as to heat number and provided the mill analyses accompany the report, perform one tensile and one bend test from each 10 tons or fraction thereof of each size of reinforcing bar.
 - 2. Reinforcing Bars: Where positive indentification of the heat number cannot be made, perform one series of tests on each 2 ½ tons or fraction thereof of each size of reinforcing bar.
- D. Material Certificates: For steel reinforcement signed by manufacturers.

- E. Field quality-control test and inspection reports.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, unless modified by requirements in the Contract Documents.
 - 1. California Building Code (2022 CBC) as adopted by the Division of the State Architect, Structural Safety Section.
 - 2. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 - 3. ACI 318, "Building Code Requirements for Reinforced Concrete."
 - 4. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- B. Material Testing Service: The Owner will engage a testing agency acceptable to Architect to perform material evaluation tests. Materials and installed work may require testing and retesting at any time during progress of Work. Retesting of rejected materials for installed Work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
- C. Plain-Steel Wire: ASTM A 82, as drawn.
- D. Deformed-Steel Wire: ASTM A 496.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - 3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.3 FABRICATING REINFORCING

A. Fabricate steel reinforcing according to CRSI's "Manual of Standard Practice".

PART 3 - EXECUTION

3.1 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Provide 1 1/2" minimum clear between reinforcing and pipe sleeves or wrapping.

END OF SECTION 03-20-00

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
 - 1. Foundations and footings for buildings.
 - 2. Slabs-on-grade within the limits of the buildings.
 - 3. Foundation walls for buildings.
 - 4. Equipment pads and bases.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 2 Section "Portland Cement Concrete and Concrete Finishes" for exterior concrete paving and appurtenances.
 - 2. Division 3 Section "Concrete Formwork".
 - 3. Division 3 Section "Concrete Reinforcing".

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including admixtures, patching compounds, waterstops, joint systems, and others if requested by Architect.
- C. Laboratory test reports for concrete materials and mix design test.
- D. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. California Building Code (2022 CBC) as adopted by the Division of the State Architect, Structural Safety Section.
 - 2. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 - 3. ACI 318, "Building Code Requirements for Reinforced Concrete."
- B. Concrete Testing Service: The Owner will engage a testing agency acceptable to Architect to perform material evaluation tests and to design concrete mixes. Mix designs shall be signed and stamped by a California registered Civil Engineer.
- C. Materials and installed work may require retesting at any time during progress of Work. Retesting of rejected materials for installed Work shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type II. Use one brand of cement throughout Project unless otherwise acceptable to Architect.
- B. Fly Ash: ASTM C 618, Type F.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. Provide fine and coarse aggregates that have a proven history of non-reactivity and are classified as "Innocuous". Submit reactivity test reports in accordance ASTM C 289. Tests shall have been conducted on the aggregates within the past 6 months.
 - 2. Coarse aggregate: clean, hard, fine-grained, sound crushed rock, and/or washed gravel free of oil, organic matter or other deleterious substances as limited by Table 3, ASTM 33.
 - 3. Fine aggregate: washed natural sand free of deleterious substances as limited by table 1, ASTM C33.
 - 4. Any suitable individual grading of coarse aggregates may be used provided the grading of combined aggregates shown in the table below is obtained.

| Sieve number or size | Percentage by weight |
|----------------------|----------------------|
| Inches | One inch maximum |
| Passing a 1-inch | 90-100 |
| Passing a 3/4 inch | 70-90 |
| Passing a 3/8 inch | 45-65 |
| Passing a No. 4 | 31-47 |

| | |
|-------------------|-------|
| Passing a No. 8 | 23-40 |
| Passing a No. 16 | 17-35 |
| Passing a No. 30 | 10-23 |
| Passing a No. 50 | 3-10 |
| Passing a No. 100 | 0-3 |

- D. Water: Potable.
- E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- F. Water-Reducing Admixture: ASTM C 494, Type A.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. WRDA, W.R. Grace & Co.
 - b. Pozzolith Normal or Polyheed, Master Builders, Inc.

2.3 RELATED MATERIALS

- A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217- inch- thick galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Sand Cushion: Clean, manufactured or natural sand (ASTM D2488) of which less than 3 percent passes the No. 200 sieve.
- C. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154. Polyethylene sheet shall conform to ASTM E 1745 Class A (Plastics), not less than 15 mils (0.015 inch) in thickness and have a Water Vapor Transmission Rate (WVTR) less than or equal to 0.006 gr/ft²/hr as tested by ASTM E 96.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to the following:
 - a. Stego Wrap (15-mil) Vapor Barrier by Stego Industries
 - b. Perminator 15 mils by W.R. Meadows
 - c. Moistop Ultra 15 mils by Fortifiber
- D. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd., complying with AASHTO M 182, Class 2.
- E. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.

2. Polyethylene film.
3. Polyethylene-coated burlap.

F. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.

2.4 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. Use the Owner's independent testing agency to prepare and report proposed mix designs. Limit use of fly ash to not exceed 25 percent of cement content by weight. Per DSA IR-19-3, for mix designs which utilizing 15 percent or more fly ash, proportioning shall be based on field experience or trial mixtures, per ACI 318, Section 26.4.3. Proportioning per ACI 318 Section 26.4.3.1(b) (without Field Experience or Trial Mixtures) is not allowed. For slabs, use water/cement ratio of 0.42.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.

C. Design mixes to provide normal and light weight concrete with the following properties as indicated on drawings and schedules:

1. Slabs-On-Grade (normal weight): 3,000 psi, 28-day compressive strength; water-cement ratio, 0.42 maximum; 3% maximum air content (including entrapped and entrained air).
2. All other Concrete (normal weight): 3,000 psi, 28-day compressive strength; water-cement ratio, 0.50 maximum (non-air entrained).

D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps, slabs, and sloping surfaces: 4 inches \pm 1/2 inch
2. Reinforced foundation systems: Not less than 3 inches and not more than 5 inches.
3. Other concrete: 4 inches \pm 1 inch.

E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.5 ADMIXTURES

A. Use water-reducing admixture in concrete, as required, for placement and workability.

- B. Use admixtures for water reduction in strict compliance with manufacturer's directions.

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
 - 1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape. Cover vapor retarder/barrier with sand cushion and compact to depth indicated.

3.3 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

- E. Contraction (Control) Joints in Slabs-on-Grade: Form weakened plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface before concrete develops random contraction cracks.
 2. If joint pattern is not shown, provide joints not exceeding 15 ft. in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
 3. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.4 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork 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 items to be attached.
- B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- C. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into proceeding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 3. Maintain reinforcing in proper position on chairs during concrete placement.
- F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F. Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.6 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas

repaired, patched, fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
 - 1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
 - 1. Combine one part Portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard Portland cement and white Portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 - 2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.7 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, and where indicated.
 - 1. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, and where indicated.
 - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
 - 1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied floor covering system.
 - 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10 foot-long straight edge resting on 2 high spots place anywhere on the surface does not exceed 3/16 inch.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
- E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.8 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.9 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting; keep continuously moist for not less than 7 days.
- C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
- D. Provide moisture curing by the following methods:
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Use continuous water-fog spray.
 - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
 - 1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

- G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
 - 1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.10 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to

- the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Architect.
- 3.11 QUALITY CONTROL TESTING DURING CONSTRUCTION
- A. General: The Owner will employ a testing agency to perform tests and to submit test reports.
 - B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.
 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - c. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store

- cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
- d. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
- C. Test results will be reported in writing to Architect, Structural Engineer, DSA's Inspector-of-Record, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03-30-00

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Structural steel.
 - 2. Grout.
- B. Related Sections include the following:
 - 1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
 - 2. Division 5 Section "Metal Fabrications" for miscellaneous steel fabrications and other metal items not defined as structural steel.
 - 3. Division 9 Section "Painting" for surface preparation and priming requirements.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.
- D. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pre-tensioned and slip-critical high-strength bolted connections.
 - 5. Provide shop drawings on 24"X36" sheets.
- C. Welding Procedure Specifications (WPS's): In accordance with AWS D1.1 requirements for each different welded joint proposed for use whether pre-qualified or qualified by testing. The WPS shall specify all applicable variables of AWS D1.1 and, in addition, reference the manufacturer's name and type of electrode with filler metal. A copy of the manufacturer's electrode data sheet shall be attached to the WPS.
- D. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Tension-control, high-strength bolt-nut-washer assemblies.
 - 4. Shop primers.
 - 5. Non-shrink grout.

1.5 QUALITY ASSURANCE

- A. Inspection of Welding: Inspection of all shop and field-welding operations shall be made by a qualified welding inspector. Such inspector shall be a person trained and thoroughly experienced in inspecting welding operations. The inspector's ability to distinguish between sound and unsound welding shall be reliably established. The minimum requirements for a qualified welding inspector shall be as those for an AWS-certified welding inspector (CWI), as defined in the provisions of the AWS QC1.
 - 1. The ability of each welder to produce sound welds of all types required by the work shall be established by welder qualification satisfactory to the testing agency.
 - 2. Welding inspection of structural welding shall conform to the requirements of AWS D1.1, except as modified by this section.
 - 3. Welding inspection of Cold-formed steel members shall conform to the requirements of AWS D1.3.
 - 4. The welding inspector shall make a systematic record of all welds. This record shall include in addition to other required records:
 - a. Identification marks of welders.
 - b. List of defective welds.

- c. Manner of correction of defects.
 5. The welding inspector shall check the material, equipment, details of construction and procedure, as well as the welds. The inspector shall also check the ability of the welder. The inspector shall furnish the Architect and Structural Engineer with a verified report that the welding is proper and has been done in conformity with AWS D1.1 and the approved plans and specifications. The inspector shall use all means necessary to determine the quality of the weld. The inspector may use gamma ray, magnaflux, trepanning, sonics or any other aids to visual inspection which the inspector may deem necessary to be assured of the adequacy of the welding.
 - B. Comply with applicable provisions of the following specifications and documents:
 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
 3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design".
 4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
 5. RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
- 1.6 DELIVERY, STORAGE, AND HANDLING
 - A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- 1.7 COORDINATION
 - A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

- 2.1 STRUCTURAL-STEEL MATERIALS
 - A. W-Shapes: ASTM A 992
 - B. Channels, Angles: ASTM A 36

- C. Plate and Bar: ASTM A 36 and A572 Grade 50.
- D. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53, Grade B.
- F. Welding Electrodes: E70XX or E71XX (AWS D1.1, 70 KSI). Use low hydrogen electrodes for welding reinforcing steel.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy hex head steel structural bolts with splined ends; ASTM A563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers. Provide plain finish or galvanized, where indicated on each component.
- B. Unheaded Anchor Rods: ASTM F 1554, Grade 36
 - 1. Configuration: Straight
 - 2. Nuts: ASTM A 563 heavy hex carbon steel.
 - 3. Plate Washers: ASTM A 36 carbon steel.
 - 4. Washers: ASTM F 436 hardened carbon steel.
 - 5. Finish: Plain
- C. Threaded Rods: ASTM A 307, Grade A .
 - 1. Nuts: ASTM A 563 heavy hex carbon steel.
 - 2. Washers: ASTM A 36
 - 3. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.

2.3 PRIMER

- A. Primer: Primer specified in Section 9 – High Performance Coatings.

2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, non-corrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design"
 - 1. Camber structural-steel members where indicated.
 - 2. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected.
 - 3. Mark and match-mark materials for field assembly.
 - 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning".
- F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Slip critical.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches .
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to SSPC-SP 2, "Power Tool Cleaning".
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

2.8 GALVANIZING

- A. Hot-Dip Galvanizing Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2.9 SOURCE QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports, and provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of concrete-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 - 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.

2. Weld plate washers to top of base plate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
 4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Slip critical.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
 - 1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 05-12-00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Exterior and interior load-bearing wall framing.
- 2. Interior non-load-bearing wall framing.
- 3. Ceiling joist framing.
- 4. Soffit framing.

- B. Related Requirements:

- 1. Division 5 Section "Metal Fabrications" for miscellaneous steel shapes, and connections used with cold-formed metal framing.

1.3 SUBMITTALS

- A. Product Data: For each type of product.

- B. Product Certificates: For each type of code-compliance certification for studs and tracks.

- C. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.

- 1. Steel sheet.
- 2. Mechanical fasteners.
- 3. Vertical deflection clips.
- 4. Miscellaneous structural clips and accessories.

- D. Evaluation Reports: For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Stud Manufacturers Association.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CEMCO; California Expanded Metal Products Co.
 - 2. ClarkDietrich.
 - 3. Nuconsteel, A Nucor Company.

2.2 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: ST33H or ST50H.
 - 2. Coating: G60.
- B. Steel Sheet for Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: 50 (340), Class 1 As required by structural performance Insert grade.
 - 2. Coating: G60 (Z180) Insert coating designation.

2.3 EXTERIOR AND INTERIOR LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0538 inch.

2. Flange Width: 1-5/8 inches.
 3. Section Properties: Per plans.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0538 inch.
 2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0538 inch.
 2. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications Insert dimension. Retain "Drift Clips" Paragraph below if drift clips are required to accommodate horizontal and vertical deflection of the primary structure.
- E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0329 inch.
 2. Flange Width: 1-5/8 inches.
 3. Section Properties: Per plans.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0329 inch.
 2. Flange Width: 1-1/4 inches.

- C. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0538 inch.
 - 2. Flange Width: 1 inch plus the design gap for one-story structures.

2.5 CEILING JOIST FRAMING

- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with standard holes, with stiffened flanges, per drawings.

2.6 SOFFIT FRAMING

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, per drawings.

2.7 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Gusset plates.
 - 8. Stud kickers and knee braces.
 - 9. Joist hangers and end closures.
 - 10. Hole-reinforcing plates.
 - 11. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by mechanically deposition according to ASTM B 695, Class 50.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; 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 AC01 as appropriate for the substrate.
 - 1. Uses: Securing cold-formed steel framing to structure.
 - 2. Type: Torque-controlled expansion anchor..
 - 3. 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.
 - 4. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
- D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Cement Grout: Portland cement, ASTM C 150/C 150M, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.10 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - c. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing 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.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 EXTERIOR AND INTERIOR LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16 inches.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated but not more than 48 inches apart. Fasten at each stud intersection..
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 18 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 1. Install solid blocking at 96-inch centers indicated.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16 inches.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect vertical deflection clips to studs and anchor to building structure.
 - 4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.

- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated but not more than 48 inches apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 18 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 1. Install solid blocking at 96-inch centers.

- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated.

- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
 - 1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.

2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.
 3. Position joists to bear directly over steel studs below.
- C. Space joists not more than 2 inches from abutting walls, and as follows:
1. Joist Spacing: As indicated on Drawings.
- D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.
1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated. Fasten bridging at each joist intersection as follows:
1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
 2. Combination Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.7 ERECTION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.8 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 06 05 73 – FIRE RETARDANT WOOD TREATMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fire retardant treatment of lumber and plywood.
- B. Related Sections include the following:
 - 1. Section 06 10 00 – Rough Carpentry

1.3 REFERENCES

- A. ASTM International (ASTM)
 - 1. ASTM A153/A153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 2. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated(Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM D2898 – Standard Practice for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing.
 - 4. ASTM D5516 - Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures.
 - 5. ASTM D5664 – Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber.
 - 6. ASTM D6305 – Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing.
 - 7. ASTM D6841 – Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant Treated Lumber.
 - 8. ASTM E69 – Test Method for Combustible Properties of Treated Wood by the Fire-Tube Apparatus.
 - 9. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.

10. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 11. ASTM E2768 – Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test).
- B. National Fire Protection Association (NFPA)
1. NFPA 101 – Life Safety Code
 2. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials
 3. NFPA 258 – Recommended Practice for Determining Smoke Generation of Solid Materials.
 4. NFPA 703 – Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials.
 5. NFPA 5000 – Building Construction and Safety Code
- C. Underwriters Laboratory (UL)
1. UL 263 – Fire Tests of Building Construction and Materials.
 2. UL 723 – Test for Surface Burning Characteristics of Building Materials.
- D. American Wood Preservers’ Association (AWPA)
1. AWPA E12 – Standard Method of Determining Corrosion of Metals in Contact with Treated Wood
- E. The State Fire Marshall (SFM)
1. SFM Standard 12-7A-1 – Exterior Wall Siding and Sheathing
 2. SFM Standard 12-7A-5 – Ignition Resistant Material
- F. Uniform Evaluation Service -IAPMO
1. UES-IAPMO 478 - FX Lumber Guard and FX Lumber Guard XT
- 1.4 SUBMITTALS
- A. Submit under provisions of Section 01 33 00 Submittals
- B. Product Data: Manufacturer’s instructions for use, including requirements for storage, cutting and finishing.
- C. Preservative Treatment Certification: Treating plant’s certification of compliance with specified standards, process employed, and preservative retention values.
- D. Fire-Retardant Treatment Certification: Treating plant’s certification of compliance with specified requirements.

- E. Safety Data Sheets (SDS): Relating to all products, chemicals, and solvents.

1.5 QUALITY ASSURANCE

- A. ICC-ES Evaluation Report: Provide appropriate current evaluation report stating compliance with AC66 for exterior fire-retardant-treated plywood and lumber in accordance with ISO 17065
- B. Wood Treatment Plant Qualifications: Wood treatment plant experienced in performing work of this section.
- C. Source Quality: Obtain treated wood products from a single approved source.
- D. Preservative Treatment: Mark each piece of plywood and lumber to show compliance with specified standards.
- E. Fire-Retardant Treatment: Mark each piece of plywood and lumber to show compliance with specified standards.
- F. Regulatory Requirements: Provide fire retardant treatment which complies with the following regulatory requirements:
 - 1. California Building Code (CBC) Chapter 7A
 - 2. California Building Code (CBC) Section 2303.2
- G. Independent Third Party Inspection
 - 1. Provide evidence of ongoing quality assurance surveillance by an IAS approved inspection agency in accordance with ISO 17020.
- H. Kiln Dry after Treatment (KDAT): Provide kiln dry material as indicated or required.
 - 1. Kiln dry treatment to 19 percent maximum moisture content for lumber and 15 percent for plywood in accordance with AWPA T1, Section 7 – Drying after Treatment (lumber) and AWPA T1, Section F: Pressure treated composites (3c) kiln drying after treatment.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery of FRT Lumber: Deliver fire-retardant-treated lumber in sizes and quantities indicated and at the construction scheduled times. Packaged or wrapped materials are to be in their original, undamaged wrapping, bearing label clearly identifying manufacturer's name, grade, and species of plywood, and other pertinent data. Use nonmarring slings for loading, unloading, and handling members to prevent damage to surfaces or wrapping.

- B. Storage and Handling of FRTW: Store wrapped materials in their original wrapping until ready for installation. Place members on level supports off ground, spaced and braced to allow through ventilation. Cover wood and keep free of dirt, grease, moisture or foreign matter.
- C. Exposure: Protect wood products against moisture and dimensional changes, in accordance with instructions from the manufacturer/treating plant.

1.7 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard 50-year limited warranty for pressure treated fire-retardant treated wood.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Chemco, Inc. manufacturer of Saferwood-FX/Thermex FR Treated Wood; address: 4191 Grandview Rd., Ferndale, WA 98248; Tel. no.: 360-366-3500; www.chemco.org; Email: info@chemco.org
- B. Requests for substitutions will be considered in accordance with the provisions of Section 01 25 10 – Product Options and Substitutions.
- C. Substitutions: Not permitted.

2.2 MATERIALS

- A. Dimension Lumber
 - 1. As specified in Section 06 10 00 Rough Carpentry.
 - 2. As specified under "Rough Carpentry" on sheet S-101 (General Notes).
 - 3. Species of Douglas Fir, Southern Pine (structural grade only), Spruce-Pine-Fir, Western Red Cedar, Redwood, or Western Hem Fir, common grade or structural grade.
 - 4. Fire-retardant treated under the name SaferWood-FX, Thermex-FR, or FRX and treated for exterior application.
- B. Structural Plywood
 - 1. As specified in Section 06 10 00 Rough Carpentry.
 - 2. As specified under "Rough Carpentry" on sheet S-101 (General Notes).

3. Species of Douglas Fir, Southern Pine (structural grade only), Spruce-Pine-Fir, Western Red Cedar, Redwood, or Western Hem Fir, Structural I grade.
 4. Fire-retardant treated under the name SaferWood-FX, Thermex-FR, or FRX and treated for exterior application.
- C. Fasteners and Metal Hardware: Provide corrosion resistant steel fasteners with hot-dipped zinc coating per ASTM A153/A153M, provide corrosion resistant hardware per ASTM A653/A653M Class G-185 in compliance with California Building Code requirements.
- D. Fasteners used in FX Lumber Guard and FX Lumber Guard XT Treated Wood: Use only Code approved fasteners as specified in UES-IAPMO 478. Fasteners must be galvanized steel, stainless steel, silicon bronze or copper per CBC Section 2304.10.6.3.

2.3 FIRE RETARDANT PRESSURE TREATMENT OF LUMBER AND PLYWOOD

- A. Fire retardant treatment for wood, including roof and floor trusses, roof decks and sheathing, subflooring, beams and purlins, blocking and furring, studs, joists and paneling, architectural millwork and trim, interior non-load bearing partitions and exterior load bearing walls.
1. Lumber: Comply with UES -IAPMO 478
 2. Plywood: Comply with UES -IAPMO 478
 3. Surface Burning Characteristics: UL FR-S rating or flame spread, and smoke developed ratings of 25 or less in a test of 30 minutes duration in accordance with CBC Section 2303.2
 4. Treatment: Saferwood/Thermex FR as manufactured by Chemco.
 5. Kiln dry after treatment to 19 percent maximum moisture content for lumber and 15 percent for plywood.
 6. Treat wood used for the following applications:
 - a. Roof and floor trusses.
 - b. Roof decks and sheathing.
 - c. Subflooring.
 - d. Beams and purlins.
 - e. Studs and joists.
 - f. Exterior load-bearing walls protected by weather barrier.

PART 3 - EXECUTION

3.1 MANUFACTURERS INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

- A. Inspect each fire-retardant treated wood prior to use. Do not use pieces exhibiting excessive bowing, cupping twisting, checking or warping.
- B. Fire-retardant treated wood that is wet or has been wet will need to be dried to Code-required moisture content before installation.

3.3 INSTALLATION

- A. Fire-Retardant Treated Wood
 1. End cuts and drilling are permitted.
 2. Do not rip or mill lumber after fire-retardant treatment.
 3. Plywood may be cut or ripped in any direction.
 4. Use only manufacturer recommended fasteners.

END OF SECTION 06 05 73

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Framing with timber.
 - 3. Wood blocking, cants, and nailers.
 - 4. Wood furring and grounds.
 - 5. Wall and roof sheathing
 - 6. Plywood backing panels

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Timber: Lumber of 5 inches nominal or greater in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. RIS: Redwood Inspection Service.
 - 2. WCLIB: West Coast Lumber Inspection Bureau.
 - 3. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Wood-preservative-treated wood.
 2. Engineered wood products.
 3. Power-driven fasteners.
 4. Powder-actuated fasteners.
 5. Expansion anchors.
 6. Metal framing anchors.

1.5 QUALITY ASSURANCE

- A. Comply with applicable provisions of the following codes, specifications, and documents:
1. California Building Code (2022 CBC) as adopted by the Division of the State Architect, Structural Safety Section. Specifically, Chapter 23 as it relates to this project.
 2. DSA Interpretation of Regulations (IR) 23-1 through 23-9.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber and plywood flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece
 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Wood Structural Panels:

1. Plywood Doc PS 1
2. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
3. Factory mark panels to indicate compliance with applicable standard.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA C2 except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece
- D. Application: Treat items indicated on drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: At time of dressing, 19 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness. Lumber to be grade stamped S-DRY. At Contractor's option, lumber can be furnished S-GRN, seasoned at the site and installed when the moisture content reaches 19 percent maximum. The moisture content shall be verified by the DSA project Inspector of Record prior to installation.
- B. Joists, Rafters, and Other Framing Not Listed Above: No. 1 grade, Douglas fir-larch; WCLIB or WWPA. As an alternate, machine stress-rated dimension lumber with a grade of not less than 1950f-1.3E is acceptable.

2.4 TIMBER FRAMING

- A. Provide timber framing complying with the following requirements, according to grading rules of grading agency indicated:
1. Species and Grade: Douglas fir-larch, No. 1 grade, WCLIB, or WWPA.
 2. Maximum Moisture Content: At time of dressing, 19 percent. Refer to Section 2.3, paragraph A above for additional information.
 3. Additional Restriction: Free of heart centers.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Cants.
 5. Furring.
- B. For items of dimension lumber size, provide No. 1 grade, Douglas fir-larch lumber with 19 percent maximum moisture content.
- C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 WALL SHEATHING

- A. Plywood Wall Sheathing: Exposure 1, Structural 1 sheathing.
1. Span Rating: Not less 32/16.
 2. Nominal Thickness: Not less than 15/32 inch.

2.7 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exposure 1, Structural I sheathing.
1. Span Rating: Not less than 40/20.
 2. Nominal Thickness : Not less than 5/8 inch.

2.8 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 5/8 inch nominal thickness.

2.9 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272. Submit manufacturer's current ESR-ECC Report stating that their glue nails are recognized for use in engineered diaphragms and shear walls (LFRAs)
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1Bolts: Steel bolts complying with ASTN A 307, Grade A with ASTM A 563 hex nuts and, where indicated, flat washers.

2.10 METAL FRAMING ANCHORS

- A. Basis-of-Design Products: Subject to compliance with requirements, Simpson Strong Tie Co., Inc. or comparable products by one of the following:
 - 1. USP Structural Connectors.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation.
 - 1. Use for interior locations where stainless steel is not indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions. When installed over plywood sheathing, use long nails per manufacturer's recommendations.
- C. Do not splice structural members between supports, unless otherwise indicated.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- E. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
 - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- G. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.

- H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated on drawings.
- I. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
- J. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- K. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- L. Coordinate wall and roof sheathing installation with flashing and joint sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through the completed assembly.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 TIMBER FRAMING INSTALLATION

- A. Install timber with crown edge up and provide not less than 4 inches of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports as indicated if not continuous.
- B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch air space at sides and ends of wood members.
- C. Install wood posts using metal anchors indicated.
- D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.4 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1 Wall and Roof Sheathing:

- a. Nail to wood framing
- b. Space panels 1/8 inch apart at edges and ends.
- c. Install nails with heads flush with the face of panel. So not over-drive nails.

3.5 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06-10-00

SECTION 07 54 16 – KEE MEMBRANE ROOFING

PART 1 - PART 1 – GENERAL

1. Summary

A. Scope

1. Furnish and install an adhered FiberTite Roofing System as manufactured and supplied by:

Seaman Corporation
1000 Venture Blvd.
Wooster, Ohio 44691
Tel.: 1-800-927-8578
Fax: 1-800-649-2737

B. Special Conditions

1. This specification is applicable to only those building roofs that have decking of sufficient structural integrity, capable of supporting a FiberTite Roofing System according to the guidelines set forth herein.
2. All applications and project specifications require review by FiberTite Technical Customer Services (FTCS) for acceptance prior to any commitment to provide a commercial warranty.
3. Seaman Corporation FiberTite Pre-installation Notice (FTR-PIN), must be completed, signed by an authorized roofing contractor, submitted to and approved by FTCS before any consideration for warranty and/or the release of any materials can be authorized.

C. Special Design Considerations

1. The building owner may be required to submit an engineering study, or Statement of Sound Roof Structure, to FTCS, indicating that the structure is able to accommodate additional live and/or dead loads including snow and water retention.
2. Moisture conditions in existing roof(s), new structural concrete or new lightweight insulating concrete which would impair or prohibit the desired performance of the new roof system.
3. Coal tar recover and/or direct contact with bituminous materials.
4. Positive slope to promote adequate drainage to avoid the potential damage to the substrate or components.
5. Roof areas subject to heavy or excessive mechanical traffic.

D. Environmental Considerations

1. Chemical discharge not listed on the Seaman Corporation/FiberTite chemical resistance publication.
2. Environmental conditions such as fog, dew, rain or snow and/or freezing temperatures can have a detrimental effect on the application and performance of adhesives.
3. Compliance with EPA and OSHA requirements as published by local, state and federal authorities.
4. All adhesives can be described as temperamental. The contractor must be aware of all potential environmental variables when installing adhered roofing systems.
5. Pay particular attention to and follow all adhesive storage and application precautions/guidelines.
6. Do not apply/use waterborne adhesives (FTR-490 or FTR 390) if the ambient air temperature is expected to drop below 32°F (0°C) within 72 hours of application.
7. The use of polystyrene insulation/coverboard assemblies for adhered roofing systems incorporating solvent borne adhesives shall also include a minimum 10-mil polyethylene solvent barrier between the insulation and coverboard.

2. FIBERTITE ROOFING SYSTEMS (FTR) REFERENCES

- A. FiberTite Construction Details
- B. FiberTite Foreman's Manual
- C. FTR GS08/17
- D. FiberTite Technical Bulletins

3. QUALITY ASSURANCE

- A. FiberTite Roofing Systems shall be installed only by a roofing contractor, authorized by Seaman Corporation to install FiberTite Roofing Systems prior to bid and/or contract award. Herein, the term Authorized FiberTite Roofing Contractor is synonymous with authorized, roofing contractor and/or contractor.
- B. Roofing contractor's key personnel shall have received specialized training in the installation of FiberTite Roofing Systems by Seaman Corporation.
- C. FiberTite Roofing Systems shall be installed in accordance with the most current guide specifications (FTR AD08/17) and details as amended and/or authorized by FTCS for specific project requirements.
- D. There shall be no deviations from approved contract specifications or shop drawings without prior written approval by the owner/owner representative and FTCS.

- E. Unauthorized deviations may subject the roof system to warranty ineligibility.
- F. Any and all work found to be substandard or in violation of the Contract Documents or Manufacturer's Specifications shall be subject to rejection including complete removal and replacement with new materials at the expense of the contractor.
- G. Upon completion and certification by the contractor that a quality installation has been completed in accordance with the approved contract specifications and all field welds have been probed and inspected, a quality assurance inspection of the roof system shall be performed by FTCS for acceptance and approval.
- H. All field seams shall be visible and available to FTCS at the time of final inspection.

4. SUBMITTALS

- A. The following information shall be submitted to FTCS for review before warranty consideration, material shipment or acceptance can be confirmed.
 - 1. Complete copy of project architectural specifications or roofing contractor's proposal outlining design parameters.
 - 2. Complete list of accessories or materials not manufactured or expressly authorized for use in FiberTite literature.
 - 3. Dimensioned outline of the roof indicating all FTR-Detail references.
 - 4. Dimensioned shop drawings illustrating non-FiberTite details. Details that do not conform with standard FiberTite details shall be returned with appropriate recommendations.
- B. At the time of contract award, the roofing contractor shall submit to the owner/owner's representative the following:
 - 1. Most recent published technical literature and guide specifications issued by FTCS.
 - 2. Roofing Contractor's approved copy of submittal form FTR-PIN.
 - 3. Dimensioned shop drawings, including roof plan detailing perimeter enhancement, flashing methods, terminations and acceptance by FTCS.
 - 4. Written approval from FTCS confirming any accessories submitted, not manufactured or expressly approved in FiberTite literature are acceptable and compatible with the proposed FiberTite Roofing System.
 - 5. Material Safety Data Sheets (MSDS) relating to all products, chemicals and solvents.
 - 6. Certification that the system specified complies with all identifiable building code and insurance requirements.

5. DELIVERY & STORAGE

- A. Deliver all materials to the job site in manufacturer's original, unopened containers, with legible labels and in sufficient quantity to allow for continuity of work.
- B. Select and operate material handling equipment in a safe manner, guarding against damage to existing construction or newly applied roofing and conforming to manufacturer's recommendations of handling and storage.
- C. All rolls of membrane shall be stored, lying down, elevated above the roof deck and completely protected from moisture with tarpaulins. Manufacturer's packaging is not considered adequate for outdoor storage.
- D. Insulation and cover board materials shall be elevated on pallets and fully protected from moisture with tarpaulins. Manufacturer's packaging is not considered adequate protection from moisture.
- E. All adhesives and sealants shall be safely stored between 50° F and 80°F prior to use.
- F. Flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow all precautions as outlined in manufacturer's Material Safety Data Sheets.
- G. Materials, having been determined by the owner/owner's representative to be damaged, shall be immediately removed from the construction site and replaced at no cost to the owner.

6. JOB CONDITIONS

A. Safety

- 1. Take all necessary precautions regarding worker health and safety when using solvents and adhesives
- 2. Worker safety is paramount when working on steep slopes.
- 3. FiberTite is slippery when wet, exhibits dew, frost, ice or any other form of moisture.
- 4. Comply with all OSHA requirements for roof construction and fall protection where required.
- 5. Store flammable liquid and materials away from open sparks, flames and extreme heat.
- 6. Take necessary precautions when using solvents and adhesives near fresh air intakes.
- 7. Daily site cleanup shall be performed to minimize debris and hazardous congestion.

B. Protection

- 1. Schedule installation sequence to limit access and utilization of the newly installed membrane for material storage, construction staging, mechanical and/or excessive foot traffic.
- 2. Provide proper protection on all newly completed roofing to avoid damage to the new roofing system.
- 3. Traffic should be minimized on a freshly laid roof.

4. Protect building walls, rooftop units, windows and other components during installation.

C. Additional Precautions

1. Adverse weather conditions e.g. extreme temperature, high winds, high humidity and moisture, could have a detrimental effect on adhesives, general production efforts and/or the quality of the finished installation. Contact FTCS for recommendations and acceptable tolerances.
2. Daily production schedules of new roofing shall be limited to only that which can be made 100% watertight at the end of the day, including all flashing and night seals.
3. All surfaces to receive the new roof system, including insulation and flashing, shall be free from all dirt, debris and be thoroughly dry.
4. Comply with local EPA requirements as published by local, state and federal authorities.
5. All construction debris shall be removed from the construction site and legally dispose of offsite.

7. COORDINATION

- A. Prior to installation of materials, a pre-roofing conference shall be held with the roofing contractor, and owner/owner's representative(s) to discuss the specified roofing system, coordinate its proper application and the expectations of all parties involved. The authorized roofing contractor and the owner/owner's representative shall notify all parties a minimum of fourteen days prior to the meeting.
- B. Plan and coordinate the installation of the roofing system with other trades in such a manner to avoid membrane damage, keeping the complete installation weather tight and in accordance with all approved details and warranty requirements.
- C. FTCS shall be available to make recommendations necessary to ensure compliance with project specifications and specification alternatives due to unforeseen job conditions.
- D. Field services are provided at the discretion of Seaman Corporation. A minimum two weeks notice is required to evaluate and coordinate any request for onsite technical assistance.

8. WARRANTY

A. Inspections

1. A FiberTite Technical Customer Service Representative shall inspect the completed FiberTite Roofing installation, and upon acceptance, Seaman Corporation shall issue the preauthorized warranty, subject to the terms and conditions of the sample warranty and contract documents.

B. Available Warranties

1. Seaman Corporation offers the following FiberTite Roofing System warranties:
 - a. Material Warranty provides the building owner protection against the cost of repairing defects in the membrane only. This warranty is offered at no cost to the owner. 20 year NDL.
 - b. Standard Warranty provides the building owner protection against the cost of repairing leaks as a direct result of either defects in the membrane or the workmanship involved in its installation for a period of 20 years. There is a nominal premium.

C. Maintenance

1. Along with the issuance of the warranty, a set of instructions shall be included detailing preventative maintenance requirements on the part of the building owner and noting a list of harmful substances which may damage the FiberTite roofing membrane.

PART 2 - PART 2 – PRODUCTS

PART 3 - GENERAL

- A. All products and components for the FiberTite Roofing System shall be supplied by Seaman Corporation.
- B. Components other than those manufactured and/or supplied by Seaman Corporation shall be submitted for review, prior to ordering. Any product(s) not specifically authorized in writing for the project by Seaman Corporation, shall be considered unacceptable and their performance excluded from the warranty.
- C. FiberTite Roofing Systems may be installed over or directly to preapproved insulation, cover board or composites thereof. Contact FTCS for additional information regarding compatible substrates.

PART 4 - MEMBRANE

A. Manufacturers

1. Basis of Design: 60 Mil FiberTite-SM-FB. FiberTite-FB membranes have a heat bonded 4 oz. polyester backing, as manufactured by Seaman Corporation, under the trade name FiberTite-FB, conforming to the physical properties as outlined in the associated data sheet(s). FiberTite-FB exceeds the physical property requirements and definitions as outlined in ASTM D6754 Standard Specification for Ketone Ethylene Ester (KEE) Sheet Roofing per the individual sub-assembly/base membrane listed above.
2. Or approved equal. **Substitutions will be considered after job is awarded. Any proposed substitutions will have to be accompanied by a product comparison of proposed product compared to the basis of design. Proposed product shall be equal or better than specified product in the following categories but not limited to quality, performance and warranty.**

Failure to comply with this requirement or should the proposed product be found to not to be equal will result in contractor having to provide the original specified product.

B. Flashing Membrane

60-mil FiberTite-SM-FB membrane shall be used for all respective roofing system flashing requirements to match the field membrane and warranty expectations selected for the roofing system.

C. Acceptable Substrate(s)

1. Authorized rigid insulation or cover board
2. Structural Concrete, insulated or non-insulated
3. Insulated Steel Decking
4. Existing smooth surfaced and/or granulated bituminous roof or existing single ply roof membrane
5. Existing aggregate surfaced bituminous roof with authorized insulation or cover board
6. Exterior grade plywood; insulated or non-insulated
7. Cementitious fiber or Gypsum, insulated or non-insulated
8. Cellular, lightweight insulating concrete
9. Authorized base sheet with an adhered insulation/coverboard assembly

PART 5 - RELATED MATERIALS "BY SEAMAN CORPORATION"

The following product(s)/material(s) shall be supplied by Seaman Corporation.

A. FTR Adhesives

Adhesives, supplied by Seaman Corporation have been specially formulated for FiberTite Roofing Systems.

1. FTR-490 Adhesive

A polymeric water borne, VOC compliant adhesive, one side application (substrate only), designed for bonding FiberTite-FB (fleeceback) to properly prepared and preauthorized horizontal substrates.

2. ICP CR-20 Adhesive

A dual component elastomeric polyurethane froth adhesive designed for bonding Fleece Back FiberTite membranes (spatter application) to properly prepared and preauthorized horizontal substrates.

3. FTR #201 Mastic

A trowel grade elastomeric adhesive/sealant used to adhere FiberTite flashing membranes to preapproved vertical substrates.

B. FTR Fasteners

1. FiberTite MAGNUM Series

To secure FiberTite Membranes to steel, wood and structural concrete decks. A #15-13, buttress threaded, #3 Phillips head fastener constructed of case hardened carbon steel with a reduced diameter drill point and corrosion resistant coating.

2. FiberTite-HD

To secure insulation to steel, wood and structural concrete decks. A #14-13, heavy duty threaded steel #3 Phillips truss, self tapping corrosion resistant fastener.

3. FiberTite Peel Rivets

To secure insulation, base sheet and/or membrane to steel, wood, cement fiber, Tectum fiberglass and lightweight plank decks. Threadless, high magnesium alloy fastener.

4. FiberTite Purlin Fasteners

To secure FiberTite membrane to the existing metal roofing system's structural members.

5. FiberTite BS Fasteners

Coated fastener and stress plate to secure base sheets to gypsum and cellular lightweight insulating concrete decks.

C. FTR Stress Plates

1. FTR-Magnum Series Barbed Stress Plates – used to anchor FiberTite membranes:

- a. FTR Magnum Plus – 1.5” x 2.75” Barbed Rectangular Stress Plate with radial corners; manufactured from 18- gauge AZ-50 galvalume steel.
- b. FTR Magnum R275 – 2.75” Barbed Round Stress Plate: manufactured from 20-gauge galvanized steel.
- c. FTR Magnum 2S – 2.375” Barbed Round Stress Plate; manufactured from 20-gauge galvanized steel.

2. FTR 3-in Metal Round Insulation Stress Plates- Finished with AZ-50 galvalume and have a flat/flush profile for use on rigid board surfaces.

D. Additional Components

1. FTR-101 Sealant - A single-component gun-grade polyether sealant to seal flashing termination.
2. FTR-SLS Sealant - A single-component self leveling polyether sealant for pitch pans.
3. FiberClad Metal - To fabricate metal flashing, 4' x 10' sheets of 24 gauge hot dipped G-90 steel, or 0.040" thick 3003H14 aluminum, laminated with a 0.02-mil polymeric coating.
4. FTR-Premolded Flashing(s) - Injection molded vent stack, split WrapidFlash® and inside/outside corner flashing using FiberTite vinyl compound.
5. FTR Non-Reinforced Membrane - Field fabrication membrane, 60-mil non-reinforced FiberTite vinyl membrane.
6. FTR-Tuff Track Walkway & Protection Pads - High grade walk way/protection material with slip resistant design.
7. FTR-Termination Bar - Membrane flashing(s) restraint/termination seals, nominal 0.125" x 1" x 10' 6060-T5 extruded aluminum bar with pre-punched slots, 8 inches on center.
8. FiberTite Metal Fascia System - Two piece snap-on preformed architectural Kynar metal edge systems.
9. FTR-Value Insulation - Polyisocyanurate and extruded polystyrene flat or tapered insulation.
10. FTR-601 - Dual component, single bead (ribbon applied) urethane insulation adhesive in either cartridges or pump grade. Adhesive is a non-solvent, elastomeric, urethane adhesive, specifically designed for bonding single or multiple layers of roof insulation and insulation composites and/or cover boards to structural roof decks and base sheets.
11. FiberTite VaporTite - a self-adhered bitumen and SBS polymeric Class I Vapor Barrier.
12. FiberTite Seam Cleaner - FiberTite Seam Cleaner is to be used with clean white cotton cloths/rags to clean contamination from the seam areas of the membrane prior to welding.
13. Simulated Metal Roofing Profile (Rib) – The simulated metal roofing profile shall be a Co-Extruded Ornamental Profile with a KEE compatible heat-activated adhesive as provided by Seaman Corporation.
 - a. Extruded profile shall be provided in 100 feet continuous lengths and match fleece back membrane color.

14. FTR T-Joint Covers – Pre-cut 4” x 4” 60 mil non-reinforced membrane to reinforce areas where three overlapping sheets of membrane intersect.
15. FTR-Cover Board – Secure Rock Gypsum Fiber, 1/4” mechanically attached.

PART 6 - RELATED MATERIALS

A. Wood Nailers

1. Wood Nailers are being tested to determine the effect of preservatives on metal components. Borate treated lumber seem to be the less corrosive and is strongly recommended. Installation of other types of treated lumber should be verified with a design professional.
2. Wood shall be No. 2 or better construction grade lumber.
3. Creosote or asphaltic type preservatives are not acceptable.
4. Minimum top nailer thickness shall be 1.5 inches nominal.

PART 3 EXECUTION

PART 7 - GENERAL

- A. The “Authorized” roofing contractor shall ensure strict compliance with FTR GS 02/13; General Guide Specifications for Installation of FiberTite Roofing Systems.
- B. The roofing contractor shall provide a suitable substrate surface for the proper installation of the FiberTite Roofing System, roof insulation and specified components.
- C. Application of Seaman Corporation/FiberTite materials constitutes an agreement that the roofing contractor has inspected and found the substrate suitable for the installation of the FiberTite Roofing System.
- D. The roofing contractor shall coordinate the installation to ensure that the system remains watertight at the end of each working day.

PART 8 - SUBSTRATE PREPARATION

- A. The roofing contractor shall verify that the deck condition and/or existing roof construction is suitable for the specified installation of the FiberTite Roofing System.
- B. Seaman Corporation requires fastener withdrawal values (pull out tests) on all reroofing projects to verify the suitability of decking to accept a mechanically fastened insulation and/or membrane roof system.
- C. Examine surfaces for inadequate anchorage, low areas that will not drain properly, foreign material, ice, wet insulation, unevenness or any other defect which would prevent the proper execution and quality application of the FiberTite Roofing System as specified.

- D. Prepared substrate shall be smooth, dry, and free of debris and/or any other irregularities which would interfere with the proper installation of the FiberTite Roofing System.
- E. The application of adhesives or hot asphalt directly to structural concrete, gypsum, Tectum, lightweight insulating concrete, existing smooth and/or granulated BUR materials may require sealing or priming with an appropriate elastomeric or asphalt primer prior to application.
- F. Adhesives will not bond to wet, damp or inadequately cured lightweight insulating concrete or poured structural concrete.
- G. Do not proceed with any part of the application until all defects and preparation work have been corrected and complete.

PART 9 - SUBSTRATE PREPARATION (ReRoofing)

A. General

- 1. Roofing Contractor shall inform the building owner/owner representative of any issues in regard to the condition and structural integrity of the existing decking.
- 2. The building owner/owner representative shall make and be responsible for the determination as to the proper method of treatment and/or replacement.
- 3. Reroofing applications require fastener withdrawal tests to substantiate proposed attachment patterns for the new mechanically fastened insulation systems and/or membranes.
- 4. Reroofing applications that require modification to the deck and/or insulation system should be installed to provide positive slope and subsequent positive drainage of the new FiberTite Roofing System.
- 5. All terminations of the FiberTite Roofing System must be constructed to prevent water from penetrating behind or beneath the new FiberTite Roofing System. This includes water from above, beside, below and beneath the new system.

B. Removal of Existing Roof System(s)

- 1. Remove all existing roofing material(s), insulation, flashing, metal and deteriorated wood blocking and legally dispose of off site.
- 2. Remove only enough roofing to accommodate the day's work and ensure the exposed area can be made 100% watertight at the end of the day or prior to inclement weather.

C. Re-Cover of Existing Roof System(s)

1. Remove all loose aggregate and debris by power broom and/or vacuum and legally dispose of off site.
2. Remove and replace all wet or deteriorated insulation and wood blocking.
3. Clean all exposed metal surfaces such as pipes, pipe sleeves, drains, duct work, etc., by removing loose paint, rust and any asphalt or coal tar pitch of any kind. Remove and properly discard lead sleeves at soil stacks.
4. If the existing roof is coal tar pitch, has been repaired with coal tar pitch or has been resaturated with coal tar pitch, a minimum 10-mil polyethylene pitch vapor retarder shall be installed before recovering.

D. Steel and Wood Decks

1. All rotted and/or deteriorated decking shall be removed and replaced with like kind.
2. Areas of structurally acceptable steel decking exhibiting slight surface rust shall be properly cleaned, primed and painted prior to installing the approved insulation.
3. All decking shall be inspected for proper attachment and excessive deflection that would compromise the uplift performance of the new FiberTite Roofing System.
4. Attachment and deflection deficiencies shall be repaired and brought into compliance with current, local building code requirements.

PART 10 - WOOD NAILERS

- A. Install treated lumber at the same heights as insulation layer or adjacent construction \pm 0.25 inch. Continuous treated wood nailers are to be installed at all perimeters, around roof projections and penetrations as shown in approved details.
- B. Where wood nailers are installed directly on the substrate, the substrate shall be carefully examined to confirm that the entire area provides a suitable fastening surface. All defects shall be repaired by the appropriate trade prior to installation.
- C. Nailers shall be at least 3.5 inches wide and 1.5 inches high and installed and anchored in such a manner to resist a force of 250 lbs. per linear foot of wood blocking in any direction.
- D. Nailers along parapets, curbs and expansion joints are recommended for insulated decking. Consult FiberTite Construction Details or FiberTite Technical Customer Services for optional/alternate membrane termination/securement methods.

PART 11 - BASE SHEET

A. General

1. Approved base sheet, when required or specified, shall be applied only to properly prepared and preapproved substrates.
2. Install no more than can be covered or made 100% water tight during the same working day.
3. Field pull-out tests must be performed for mechanically attached base sheets to determine fastener withdrawal performance.
4. Base sheets shall be installed starting at the low point of the roof deck.
5. Base sheet shall be side lapped, a minimum of 3 inches, and properly shingled to shed water.

B. Mechanically Attached Base Sheet

1. All base ply fasteners and stress plates for the mechanical attachment of base sheets shall be provided by Seaman Corporation.
2. For 1-90 attachment, approved base sheet is secured to the deck in the field of the roof, with FiberTite Fasteners, spaced a maximum of 7 inches on center through the minimum 3 inch side laps and staggered at a maximum 7 inch on center in two rows within the field of the sheet.
3. The number of fasteners securing the base sheet shall be increased over the field spacing by 70% in the perimeter and 160% in the corners of the roof area.
4. Fastening increases can be obtained by adding rows of fasteners and/or additional fasteners along each row.

C. Base Sheet Adhered with Hot Asphalt

1. Hot asphalt shall be applied only to properly prepared and preapproved substrates, free of any debris, dirt, grease, oil or moisture.
2. Base sheet shall be embedded into a fluid, continuous application of hot Type III steep asphalt at a minimum application rate of 25 lbs. per 100 square feet.
3. Base sheet shall be fully bonded to the substrate.

PART 12 - INSTALLATION OF FIBERTITE MEMBRANE(S)

A. Quality Control

1. It is the responsibility of the roofing contractor to initiate and maintain a Quality Control program to govern all aspects of the installation of the FiberTite Roofing System.

2. The project foreman and or supervisor will be responsible for the daily execution of the Quality Control program which will include but is not limited to the supervision, inspection and probing of all heat welded seams incorporated within the FiberTite Roofing System.
3. If inconsistencies in the quality of the application of the composite, membrane and/or welds are found, all work shall cease until corrective actions are taken to ensure the continuity the installation.

B. General

1. Work shall be coordinated to ensure that sequencing of the installation promotes a 100% watertight installation at the end of each day.
2. All FiberTite Roofing Systems shall be designed utilizing and determined to be in compliance with the procedures outlined within the current publication of ASCE Standard 7. Alternative designs may be determined using the criteria within Factory Mutual Research Loss Prevention Data.
3. A FiberTite Roofing Systems may utilize either conventional roll goods or custom prewelded panel rolls or a combination of both.
4. Restrictions regarding outside ambient air temperature are relative only to the exposure limits of the workers and/or adhesives when necessary.
5. When using adhesives outside ambient air temperature shall be above 40°F. Curing or drying time of the adhesive will be affected by ambient temperatures and must be taken into consideration.
6. Humidity can affect the drying time of solvent borne adhesives and/or cause condensation to form on the newly applied adhesive.
7. No moisture may be present on the adhesive(s) prior to mating or application of FiberTite membranes.
8. All adhered membrane systems are to be broomed in place first and then completed by pressing the membrane into the adhesive with a weighted, foam covered lawn roller or 50-lb linoleum roller. Lawn rollers should be filled with between 6 and 8 gallons (48 – 64 pounds) of water.
9. FiberTite Roofing Systems shall only be installed over properly prepared and sound substrates, free from excessive surface roughness, dirt, debris and moisture.

C. Adhered Membrane

1. The authorized roofing contractor shall assume full responsibility for any and all irregularities, defects or quality issues that arise due to failure to following published installation guidelines for the proper installation of adhered FiberTite membrane roofing systems.
2. FiberTite Fleece Back Membrane Adhered in FTR-490 Adhesive
 - a. For “all” FB membranes - Unroll approximately 30 feet of the FiberTite-FB membrane and position the roll over the properly installed/prepared substrate. Pull the tail back over the roll to expose a workable area (approx. 30') of substrate.
 - b. Apply a 100% continuous coat of adhesive to the substrate
 - c. The amount of substrate that can be coated with a workable amount of adhesive will be determined by application method, ambient temperature, humidity, and available manpower.
 - d. To ensure proper application and curing of the adhesive, the outside air temperature shall be above 40°F and rising.
 - e. FTR-490 adhesive is to be applied by spraying and back rolling or just rolling. Do not dump adhesive or pour from the cans.
 - f. Roller applied adhesive shall utilize a solvent resistant $\frac{3}{8}$ inch nap roller.
 - g. Adhesive must be rolled out to ensure a smooth, even 100% coverage of the substrate with no voids, skips, globs, puddles, or similar irregularities.
 - h. Allow the adhesive to set up only to the point that the adhesive is slightly cured but still wet. Do not allow adhesive to skin or dry out.
 - i. Water borne adhesives (FTR-490) can be directly affected by moisture. Water based adhesives shall not to be installed over/on substrates that are moist or wet or on systems or substrates that have residual moisture.
 - j. Broom the adhered portion of the membrane to ensure full contact and complete the bonding process by firmly pressing the bonded membrane into place with a weighted, foam-covered, lawn roller.

- k. Repeat the process for the remaining un-bonded portion of the membrane, lapping subsequent, adjacent rolls of membrane a minimum of 3 inches, ensuring proper shingling of the membrane to shed water along the laps.
 - l. No adhesive shall be applied to the lap "seam" areas of the membrane. Areas contaminated with adhesive are difficult to clean, will impair proper welding of the seams and require a membrane patch or strip.
 - m. Do not use bad or marginal adhesives. Contact FTCS if the quality of the adhesive is suspect.
3. FiberTite Fleece Back Membrane Adhered in FT /CR-20 Adhesive
- a. For *all* FB membranes, un-roll and position two rolls of FiberTite-FB over the properly installed/prepared substrate.
 - b. Ensure rolls are straight and the minimum 3 inch overlap between rolls is maintained.
 - c. Peel (butterfly) the rolls back in the long direction, half way upon themselves to expose the substrate and the underlying polyester fleece backing.
 - d. Apply continuous spatter pattern of FiberTite CR-20 adhesive to the substrate between the rolls; dispensing the adhesive in a spattered pop-corn spray pattern.
 - e. Spatter pattern shall achieve a nominal 80% coverage of textured coating at approximately 0.25 inch nominal thickness. The balance of the substrate will get coated as the adhesive spreads during the brooming and rolling process.
 - f. Avoid spattering the back of the FB membrane.
 - g. Do not allow adhesive to contaminate membrane overlaps. Use a sheet of insulation board to mask the spray area along adjoining membrane areas.
 - h. Overspray may be cleaned immediately with acetone while the adhesive is still wet.
 - i. Fold/maneuver the FB membrane into the wet adhesive, (approximate open time for the adhesive is 5 to 10 minutes depending on environmental conditions) avoiding wrinkles or air pockets in the FB membrane.
 - j. Broom the membrane into the wet adhesive and complete the bonding process by firmly pressing the bonded membrane into place with a weighted, foam covered lawn roller.
 - k. Repeat the process for the remaining unbonded portion of the membrane, lapping subsequent, adjacent rolls of membrane a minimum 3 inches, ensuring proper shingling of the membrane the water along the laps.

- l. No adhesive shall be applied to the lap seam areas of the membrane. Areas contaminated with adhesive are difficult to clean, may impair proper welding of the seams and may require a membrane patch or stip.
- m. FiberTite CR-20 adhesive is designed for use only when the substrate and ambient temperatures are a minimum 40°F and rising and the chemical cylinders are at least 70°F.
- n. Do not use bad or marginal adhesives. Contact FTCS if the quality of the adhesive is suspect.

D. Peel Stops for Adhered Roofing Systems

1. Seaman Corporation's standard *Terms and Conditions* for commercial warranties list 60-mph wind velocity as the first exclusion for wind events. Perimeter assurance or restraint must be provided for any modification to the standard commercial warranty.
2. Assurance or restraint is accomplished using rows of fasteners, installed parallel to exterior roof edges at a prescribed interval and fastener spacing to create a peel stop during a significant wind event.
3. Peel stops must be mechanically attached into or through the structural decking with rows of Magnum stress plates and fasteners, (or authorized alternate) at 12 inches on center. The peel stop is sealed by heat welding a nominal 6 inch strip of membrane over the fasteners.
4. Lightweight insulating concrete is generally not considered a structural component and peel stop fastening must penetrate through the lightweight into the structural component.
5. Peel Stop(s) are only required by Seaman Corporation on adhered projects requiring peak gust wind speed warranties greater than the default 60-mph articulated in the standard commercial warranty.
6. Although not required for standard commercial warranties, it is recommended that projects subject to the possibility of a significant wind event (hurricanes) should incorporate the use of peel stops in the roof system design.
7. The following are general guidelines for the use and inclusion of peel stops in adhered FiberTite Roofing Systems. Peel stop intervals are based upon the field pressure and are as follows;
 - a. Buildings with Design Velocity Pressure less than: -45 psf (FM 1-90).
No peel stop.

- b. Buildings with Design Velocity Pressure greater than: -45 psf (FM 1-90) but less than or equal to -52.5 (FM 1-105).
One peel stop at 3 feet from all exterior roof edges.
- c. Buildings with Design Velocity Pressure greater than: -52.5 (FM 1-105) but less than or equal to -60 psf (FM 1-120).
One peel stop at 3 inches from all edges and the second peel stop at 6 feet from all exterior roof edges.
- d. Buildings with Design Velocity Pressure greater than: -60 (FM 1-120) but less than or equal to -67.5 psf (FM 1-135).
One peel stop at 3 feet, a second peel stop at 6 feet and the third peel stop at 9 feet from all exterior roof edges.
- e. Buildings with Non Class 1 decking, i.e. lightweight, wood, gypsum, and cementitious wood fiber do not default to the above requirements and require additional evaluation and engineering review by FTCS.

E. Welding

1. General

- a. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
- b. All field seams must be clean and dry prior to initiating any field welding.
- c. Remove foreign materials from the seams (dirt, oils, etc.) with acetone or authorized alternative.
- d. Use CLEAN WHITE COTTON cloths and allow approximately five minutes for solvents to dissipate before initiating the automatic welder. Do not use denim or synthetic rags for cleaning.
- e. Contaminated areas within a membrane seam will inhibit proper welding and will require a membrane patch or strip.
- f. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld.

2. Hot Air Hand Welding

- a. The lap or seam area of the membrane may be intermittently tack welded to hold the membrane in place.
- b. The back interior edge of the membrane shall be welded first, with a thin, continuous weld to concentrate heat along the exterior edge of the lap during the final welding pass.

- c. The nozzle of the hand held hot air welder shall be inserted into the lap at a 45° angle to the lap. Once the polymer on the material begins to flow, a hand roller shall be use to apply pressure at a right angle to the tip of the hand welder. Properly welded seams shall utilize a 1.5 inch wide nozzle, to create a homogeneous weld, a minimum of 1.5 inches in width.
 - d. Smaller nozzles may be used for corners, and other field detailing, maintaining a minimum 1 inch weld.
 3. Automatic Hot Air Machine Welding
 - a. Proper welding of the FiberTite Membrane can be achieved with a variety of automatic welding equipment. Contact FTCS for specific recommendations.
 - b. Follow all manufacturers' instructions for the safe operation of the automatic welder.
 - c. Follow local code requirements for electric supply, grounding and surge protection.
 - d. The use of a dedicated, portable generator is highly recommended to ensure a consistent electrical supply, without fluctuations that can interfere with weld consistency.
 - e. Properly welded seams shall utilize a 1.5 inch wide nozzle, to create a homogeneous weld, a minimum of 1.5 inches in width.
- F. Inspection
 1. The job foreman and/or supervisor shall initiate daily inspections of all completed work which shall include, but is not limited to the probing of all field welding with a dull pointed instrument to assure the quality of the application and ensure that any equipment or operator deficiencies are immediately resolved.
 2. Ensure that all aspects of the installation (sheet layout, attachment, welding, flashing details, etc.) are in strict accordance with the most current FiberTite Roofing Systems Specifications and Details.
 3. Excessive patching of field seams because of inexperienced or poor workmanship will not be accepted at time of FINAL INSPECTION FOR WARRANTY ACCEPTANCE.
 4. Any deviation from preapproved specifications and/or details requires written authorization from the FTCS prior to application to avoid any warranty disqualification.
 5. It is the contractor, job foreman, and supervisor and/or quality control personnel's responsibility to perform a final self inspection on all seams prior to requesting the inspection for warranty issuance by the FTCS.

G. T-Joint Cover Installation

1. Installation of T-Joint Covers is mandatory on all FiberTite Membrane Systems greater than

nominal

50 mil, vegetated roofs, ballast roofs or where T-Joints have not been properly sealed to exhibit a

minimum 1.5" defined crease along the T-Joint.

2. Install T-Joint Covers, centered and aligned so edges are parallel to roof system seams.
3. The T-Joint Cover shall be 100% welded.

PART 13 - FLASHING

- A. Clean all vents, pipes, conduits, tubes, walls, and stacks to bare metal. All protrusions must be properly secured to the roof deck with approved fasteners. Remove and discard all lead, pipes and drain flashing. Flash all penetrations according to approved details.
- B. Remove all loose and/or deteriorated cant strips and flashings.
- C. Flash all curbs, parapets and interior walls in strict accordance with approved FiberTite details.
- D. All flashing shall be adhered to properly prepared, approved substrate(s) with FTR-190e adhesive or FTR-201 mastic applied in sufficient quantity to ensure total adhesion.
- E. The base flange of all membrane flashing shall extend out on to the plane of the deck, beyond the wood nailers to a maximum width of 8 inches.
- F. Vertical flashing shall be terminated no less than 8 inches above the plane of the deck with approved termination bar and counter-flashing or metal cap flashing.
- G. When using FTR-201 as the adhesive, vertical wall flashing termination shall not exceed 40 inches without supplemental mechanical attachment of the flashing between the deck and the termination point of the flashing.
- H. Complete all inside and outside corner flashing details with FiberTite pre-formed corners or an approved field fabrication detail.
- I. Probe all seams with a dull, pointed probe to ensure the weld has created a homogeneous bond.
- J. Install penetration accessories in strict accordance with approved details. Ensure penetration accessories have not impeded in any way the working specification. (Refer to the related trade for the technical specification).

PART 14 - METAL FLASHING

- A. All perimeter edge details are to be fabricated from FiberClad Metal or utilize a prefabricated FiberTite Fascia System.
- B. Ensure all fascias extend a minimum of 2 inches lower than the bottom of the wood nailers.

- C. Fasten all metal flashing to wood nailers or approved substrate with approved fasteners 8 inches on center.
- D. Break and install FiberClad metal in accordance with approved details, ensuring proper attachment, maintaining 0.5 inch expansion joints and the installation of a minimum 2 inch bond breaker tape prior to sealing the joint.
- E. Solidly weld FiberClad expansion joints with a 6 inch strip of FiberTite membrane welded to the FiberClad, covering the bond breaker tape (cover plates are optional).
- F. Roof Drains
 - 1. Flash all roof drains in accordance with FiberTite roof drain details.
 - 2. Replace all worn or broken parts that may cut the FiberTite membrane or prevent a watertight seal. This includes the clamping ring and strainer basket.
 - 3. Replace all drain bolts or clamps used to hold the drain compression ring to the drain bowl.
 - 4. FiberTite non-reinforced 60-mil membrane shall be used for flashing the drain assembly. Drain assemblies and basins or sumps must be free of any asphalt or coal tar pitch residue prior to installation.
 - 5. The drain target sheet should be sized and installed to provide for a minimum of 12 inches of exposed 60-mil on all sides of the drain.
- G. Pitch Pans
 - 1. EVERY REASONABLE effort shall be made to eliminate the need for pitch pans including the removal of all existing pans. Contact FTCS for specific design alternatives and recommendations.
 - 2. In the event of no alternative, fabricate pitch pans from Fiber Clad metal, installed in accordance with FiberTite details, ensuring proper attachment, maintaining a minimum of 2 inch clearance around the penetration.
 - 3. Pitch Pans shall be filled with non-shrinking grout to within 1 inch of the top of the pan. Allow the grout to dry and fill remainder of the pan with FTR-SLS pourable sealant.
 - 4. Pitch Pans and the sealant will require periodic maintenance by the building owner's maintenance personnel.

PART 15 - EXPANSION JOINTS

- A. Flash all expansion joints in accordance with authorized details. Fasten all expansion joint material according to FiberTite specifications. Ensure the expansion material has sufficient material to expand to the widest point in expansion without causing undue stress on the expansion joint material.

- B. If the expansion joint is a preformed system, the manufacturer, description and a drawing illustrating the method of installation must be included when the (FTR-PIN) is submitted.

PART 16 - SEALANTS

- A. Apply authorized sealant(s) to all surface mounted reglets and per project requirements. Sealant(s) are to shed water. Follow all manufacturer's instructions and installation guides.
- B. Use primer when recommended by the manufacturer.
- C. Sealants will require periodic maintenance by the building owner's maintenance personnel.

PART 17 - TEMPORARY SEALS

- A. At the end of each working day or at the sign of rain, install temporary, 100% watertight seal(s) where the completed new roofing adjoins the uncovered deck or existing roof surface.
- B. The authorized roofing contractor shall create and maintain the temporary seal in such a manner to prevent water from traveling beneath the new and/or existing roof system.
- C. The use of plastic roofing cement is permissible when sealing to an existing built up roof.
- D. If water is allowed to enter beneath the newly completed roofing, the affected area(s) shall be removed and replaced at no additional expense to the building owner.
- E. Prior to the commencement of work, cut out and remove all contaminated membrane, insulation, roof cement or sealant and properly dispose of off site.

PART 18 - WALKWAYS

- A. FiberTite walkways and protection pads shall be installed at staging areas for roof top equipment maintenance or areas subject to regular foot traffic.
- B. Walkway Installation
 - 1. Roofing membrane to receive walkway material shall be clean and dry.
 - 2. Cut and position the FiberTite walkway material as directed by the specifications or agreement.
 - 3. Hot air weld the entire perimeter of the walk way to the previously cleaned FiberTite roofing membrane. Avoid excessive heating of the walk way material to prevent scorching the underlying roofing membrane.
- C. Protection Pad Installation
 - 1. Roofing membrane to receive protection pad material shall be clean and dry.

2. Prior to installing the FiberTite protection pads (0.25" x 2' x 4'), weld a 6" x 6" strip of FiberTite membrane to each of the four corners of the back side of the pad. Position the strips in such a way that they overhang the edge of the pad a minimum of 2 inches around the 90° corner.
3. Position the FiberTite protection pads as directed by the specifications or agreement and weld the visible portion of the previously applied stripping to the FiberTite roofing membrane.

PART 19 - COMPLETION

- A. Remove any and all debris, excess materials and scrap of any kind from the roof and surrounding premises prior to demobilization.
- B. Inspect all field welds, detailing and terminations to ensure a 100% the watertight installation.

PART 20 - WARRANTY INSPECTION

- A. Upon completion of the project, the authorized roofing contractor shall complete and submit the FiberTite Notice of Completion to FTCS.
- B. Upon receipt of the notice of completion, a FTCS representative will schedule an inspection with a representative of the authorized roofing contractor to thoroughly review the installation and verify compliance with Seaman Corporation specifications.
- C. Any corrections or modifications necessary for compliance with the specifications and acceptance for warranty (punch list) will be noted on the Final Inspection for Warranty Form.
- D. Upon completion of all punch list items and final acceptance of the installation, a warranty as authorized by the approved Seaman Corporation/FiberTite Pre-Installation Notice will be issued.

END OF SECTION

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SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Gutters and downspouts.
2. Parapet caps
3. Roof to wall
4. Reglets, Roof Edge Flashings
5. Riser/ curb caps
6. Overflow Spout
7. Sheet metal flashing and trim not specifically specified in other sections.

- B. Related Sections:

1. Division 6 Section "Rough Carpentry Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
2. Division 7 Section "Joint Sealants"
3. Division 7 section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
4. Division 7 Section "Metal Roof Panels" for gutters, downspouts, sheet metal flashing and trim integral with metal roof panels.
5. Division 7 Section "Flexible Sheet Flashing"
6. Division 9 Section "Painting" for field painting.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated 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.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 4. Details of termination points and assemblies, including fixed points.
 - 5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
 - 6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter-flashings as applicable.
 - 7. Details of special conditions.
 - 8. Details of connections to adjoining work.

1.5 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
 - 2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 - 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 - 4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2017 NEC, as Amended by CA)
 - 5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
 - 6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
 - 7. Title 24 CCR, Part 6 - 2022 California Energy Code
 - 8. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
 - 9. Title 24 CCR, Part 10 - 2022 California Existing Building Code
 - 10. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)
 - 11. Title 24 CCR, Part 12 - 2022 California Reference Standards (Partial List)

- B. Fabricator Qualifications: Shop that 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.
- C. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- D. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
 - 2. Review methods and procedures related to sheet metal flashing and trim.
 - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
 - 5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

- 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 the extent necessary for the period of sheet metal flashing and trim installation.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sheet metal flashing and trim that fails in materials or workmanship within specified warranty period.
 - 1. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: 2 years.
- B. Installer's Warranty: 1 year.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality.
 - a. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
 - 2. Surface: Smooth, flat and mill phosphatized for field painting.
 - 3. Gage: 24 GA. minimum unless noted otherwise to be thicker. Except mechanical curb and deck caps to be 22 GA.
 - 4. Color: As selected by Architect from manufacturer's full range.
 - 5. 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.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch wide and 1/8 inch thick.

- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single—component, solvent—release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- H. Overflow Spout: J.R. Smith Model #1770
- I. Splash Block: Precast concrete

2.3 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with interlocking counterflashing on exterior face, of same metal as reglet.
 - 1. Products:
 - a. Fry Reglet Corporation.
 - b. Heckmann Building Products Inc.
 - c. Hickman, W. P. Company.
 - d. Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
 - e. Or equal.
 - 2. Material: Galvanized steel, minimum 0.022 inch thick.
 - 3. Provide one of the following types depending on substrates:
 - a. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - b. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
 - c. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.

- d. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
- e. Accessories:
 - 1) Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 - 2) Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the 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 without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- C. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored from compatible, noncorrosive metal.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

- G. Do not use graphite pencils to mark metal surfaces.

2.5 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat- stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.
 - 1. Gutter Style: SMACNA designation and as indicated on drawings.
- B. Downspouts: Field painted Schedule 40 pipe.
- C. Overflow Parapet Scuppers:
 - 1. Size: 3 (Three) times the size/area of roof drains.
 - 2. Opening: Minimum opening height of 4 inches with inlet flow line located 2 inches above low point of adjacent roof.
- D. Overflow Spout/ Snoot: JW Smith Model #1770 or approved equal.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions 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.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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, welding rods, 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 and levels indicated. 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. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat with bituminous coating or by other permanent separation as recommended by SMACNA where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Fastener Sizes:
1. Wood: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 2. Concrete or Masonry: 1/4" Tapcon concrete screw anchors 1" minimum to 1-3/4" maximum (1-1/4" minimum for gutters) penetration galvanized for interior use, stainless steel for exterior use. Hammer drill hole 3/16" and 1/2" deeper than penetration
- E. Seal joints as shown and as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, 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 Division 7 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel sheet.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
4. Copper Soldering: Tin edges of uncoated copper sheets using solder for copper.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
- C. Downspouts:
 1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
 2. Provide elbows at base of downspout to direct water away from building.
 3. Provide Cast-iron downspouts at exposed walls from grade to 8' above finish grade.

3.4 MISCELLANEOUS FLASHING INSTALLATION

- A. Overhead-Piping Safety Pans: Suspend pans independent from structure above as

indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

- B. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.6 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 installation, remove unused materials and clean finished surfaces. Maintain in a 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.

END OF SECTION 07 62 00

SECTION 07 65 00 - FLEXIBLE FLASHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Flexible sheet flashing for windows, door, and other openings and where indicated on Drawings.
- B. Related Sections include the following:
 - 1. Division 7 Section "Joint Sealants" for joint-sealant materials and installation.

1.3 SUBMITTALS

- A. Concurrent Review Requirements: Submit submittals of this section with doors and windows sections.
- B. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of flexible sheet flashing.
- C. Shop Drawings: Show locations and extent of flexible sheet flashing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
- D. Samples: For the following products:
 - 1. 12-by-12-inch square of flexible sheet flashing.
- E. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- F. Qualification Data: For Installer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for flexible sheet flashing.

1.4 QUALITY ASSURANCE

A. Reference Standards:

1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2017 NEC, as Amended by CA)
5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
7. Title 24 CCR, Part 6 - 2022 California Energy Code
8. Title 24 CCR, Part 8 - 2022 California Historical Building Code Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
9. Title 24 CCR, Part 10 - 2022 California Existing Building Code
10. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)
11. Title 24 CCR, Part 12 - 2022 California Reference Standards (Partial List)
12. Title 8 C.C.R. Chapter 4, Sub-Ch. 6 – Elevator Safety Orders.
13. Americans with Disabilities Act (ADA), Title II or Title III.

B. Installer Qualifications: A firm that is acceptable to flexible sheet flashing manufacturer for installation of flexible sheet flashing required for this Project.

C. Source Limitations: Obtain flexible sheet flashing materials through one source from a single manufacturer.

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. Build mockup with doors and windows.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to flexible sheet flashing including, but not limited to, the following:

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review and discuss the flashing to be coordinated with the finishing of doors and windows.

3. Review, discuss, and coordinate the interrelationship of flexible flashing with other exterior wall components. Include provisions for sealants and fasteners.
4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by flexible sheet flashing manufacturer.
- C. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- D. Store rolls according to manufacturer's written instructions.
- E. Protect stored materials from direct sunlight.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Flexible Sheet Flashing: Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
 1. Vycor Plus by WR Grace (Basis of Design).
 2. FortiFlash by Fortifiber.
 3. FlexWrap and StraightFlash by DuPont.
 4. Or equal.

2.2 FLEXIBLE SHEET FLASHING

- A. Self-Adhered, cross-laminated high-density polyethylene (HDPE) sheet, backed by aggressive pressure-sensitive rubberized asphalt adhesive.
 1. Thickness: 25 mil minimum per ASTM D3767, Method A.
 2. Low temperature flexibility: Unaffected at minus 45 degrees F. per ASTM D1970.

3. Elongation, ultimate failure of rubberized asphalt: 200 percent minimum per ASTM D412.
4. Cracked cycling 100 cycles: Unaffected at minus 25 degrees F. per ASTM C836.
5. Lap adhesion at minimum application temperature: 60 plf width per ASTM D1876 modified.
6. Adhesion to concrete at minimum application temperature: 60 plf width per ASTM D903.
7. ICBO: ER-6141.
8. Recommended exposure limit: 30 days.
9. Perm-A-Barrier by Grace is not acceptable.

2.3 AUXILIARY MATERIALS

- A. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by flexible sheet flashing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 1. Verify that concrete has cured and aged for minimum time period recommended by flexible sheet flashing manufacturer.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install flexible sheet flashing in accordance with the manufacturer's written instructions, AAMA Publication 2400, and the applicable code.

END OF SECTION 07650

SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Roof curbs.
 - 2. Pre-manufactured rooftop sleeper support blocks
- B. Related Sections include the following:
 - 1. Division 5 Section "Aluminum Ladders" for metal ladders and supports, to roof hatches.
 - 2. Division 7 Section "Polyvinyl-Chloride (PVC) Roofing
 - 3. Division 9 Section "Painting" for field finishes.

1.3 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. 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.
- C. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Title 19 CCR, Public Safety, State Fire Marshall Regulations

2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2017 NEC, as Amended by CA)
 5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
 6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
 7. Title 24 CCR, Part 6 - 2022 California Energy Code
 8. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
 9. Title 24 CCR, Part 10 - 2022 California Existing Building Code
 10. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)
- B. Title 24 CCR, Part 12 - 2022 California Reference Standards Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.
- 1.6 PROJECT CONDITIONS
- A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.
- 1.7 WARRANTY
- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of roof accessories that fails in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 2. Warranty Period: 2 years.
- B. Installer's Warranty: 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Roof Curbs: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - 1. MicroMetl Corporation
 - 2. Custom Curb, Inc.
 - 3. LM Curbs.
 - 4. ThyCurb; Div. of Thybar Corporation.
 - 5. Or equal. See 01 60 00 for substitution requirements

- B. Pre-manufactured rooftop sleeper blocks
 - 1. Dura-Blok roof top supports as manufactured by Eaton
 - 2. Or approved equal. See Section 01 60 00 for substitution requirements

2.2 METAL MATERIALS

- A. Galvanized Steel Sheet: ASTM A 653, G90 coated and mill phosphatized for field painting.
 - 1. Comply with Division 9 Section "Painting" for field finishes.

- B. Steel Shapes: ASTM A 36, hot-dip galvanized to comply with ASTM A 123, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.

- B. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

- C. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

- D. Roofing Cement: ASTM D 4586, non-asbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.4 ROOF CURBS

- A. Roof Curbs: Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with integral metal cant and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - a. MicroMetl Corporation
 - b. Custom Curb, Inc.
 - c. LM Curbs.
 - d. ThyCurb; Div. of Thybar Corporation.
 - e. Or equal.
 2. Material: Galvanized steel sheet, 0.079 inch thick.
 - a. Factory prime painted.
 - b. Finish: Comply with Division 9 Section "Painting".
 3. Liner: Same material as curb, of manufacturer's standard thickness and finish.
 4. Factory install wood nailers at tops of curbs.
 5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
 6. Factory insulate curbs with 1-1/2-inch- thick, cellulosic or glass-fiber board insulation.
 7. Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
 8. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.5 PRE-MANUFACTURED ROOFTOP SLEEPER BLOCKS

- A. General: Use pre-manufactured sleeper blocks that are made from 100% recycled rubber with reflective strip on each side for visibility and bolted in channel galvanized for easy support attachment security. and accessory configuration for each condition shall be as recommended by the manufacturer.
- B. DB series
1. DB5 (load is less than 200#'s per support) Size to be 6" wide by 4" tall, select widths as required to support the number of conduits and pipes supported

- C. DB10 series
 - 1. DB10 (load is more than 200#'s but less than 500#'s per support) Size to be 6" wide by 6 7/16" " tall, select widths as required to support the number of conduits and pipes supported

2.6 FINISH

- A. Galvanized Steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
 - 2. Verify dimensions of roof openings for roof accessories.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- E. Roof Hatch Installation:
 - 1. Check roof hatch for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.
- F. Roof Curb Installation:
 - 1. Set roof curb so top surface of roof curb is level
- G. Roof top sleeper support block installation.
 - 1. Install blocks level and at spacing indicated but not less than required to maintain load limits
 - 2. Every support block shall have an additional single sheet of the specified PVC thermoplastic roofing material attached to the bottom and extending 3" beyond the edges of the block.
 - 3. Install per, manufacturers requirements and recommendations
- H. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

3.3 TOUCH UP

- A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 9 painting Sections.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.4 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07 72 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants.
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Silyl-terminated polyether joint sealants.
 - 4. Butyl joint sealants.
 - 5. Latex joint sealants.
- B. Related Sections include the following:
 - 1. Division 8 Section "Glazing" for glazing sealants.
 - 2. Division 9 Section "Gypsum Board" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
 - 3. Division 9 Section "Ceramic Tile" for sealing tile joints.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 4-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- D. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint material location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.
- E. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- F. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- G. Qualification Data: For Installer.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- I. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- J. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
 - 2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 - 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 - 4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2017 NEC, as Amended by CA)
 - 5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
 - 6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
 - 7. Title 24 CCR, Part 6 - 2022 California Energy Code

8. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA
 9. Title 24 CCR, Part 10 - 2022 California Existing Building Code
 10. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)
- B. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- C. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Adhesives, sealants and caulks shall meet the following requirements of the following standards:
1. Adhesives, adhesive bonding primers, adhesive primers, Sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules as applicable or SCAQMD Rule 1168 VOC limits as shown on tables 5.504.4.1 and 5.504.4.2. Such products shall also comply with rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene) except aerosol products as specified in subsection 2 noted below.
 2. Aerosol adhesives and smaller unit sizes of adhesives and sealant or caulking compounds (in units, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on the use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with section 94507.

1.7 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated. Notify Architect/ Inspector of the non-compliant condition.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: 5 years (20 years for Silicone Sealants) from the date of Substantial Completion.
- B. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within the specified warranty period.
 1. Warranty Period: 2 years. *Substantial Completion*
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Joint Sealants: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
 1. Dow Corning Corp.
 2. Pecora Corporation.
 3. United States Gypsum Co

4. Tremco, Inc.
5. Bostik Construction Products Division
6. General Electric Sealants
7. WR Meadows
8. Or equal. (Reference substitution requirements in Section 01 25 10)

2.2 MATERIALS, GENERAL

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.
- C. Compatibility: Provide joint sealants, backings, 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.
- D. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- F. Low-Emitting Interior Sealants: Sealants and sealant primers shall comply with the testing and product requirements of the California Department of 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."

2.3 JOINT SEALANTS

- A. Type A - Acrylic Latex: One-part, non-sag, mildew resistant acrylic emulsion compound complying with ASTM C834, Type OP, Grade NF, formulated to be paintable.
 1. Tremco Inc., "Tremflex 834"

2. Bostik Construction Products Division, "Chem-Calk 11200".
 3. Pecora Corporation, "AC-20"
- B. Type B - Butyl Sealant: One-part, non-sag solvent-release-curing sealant complying with ASTM 1311 and formulated with a minimum of 75 percent solids.
1. Tremco Inc., Tremco "Bitul Sealant"
 2. Bostik Construction Products Division, "Chem-Calk 300".
 3. Pecora Corporation, "BC-158".
- C. Type C - Silicone Sealant: One-part nonacid-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25. (color per Architects selection from full range of standard colors)
1. Dow Corning Corp., "Dow Corning 791". (Color per Architects selection from full range of standard colors)
 2. General Electric Co., "SCS 2000 Silpruf". (Color per Architects selection from full range of standard colors)
 3. Pecora Corp., "890FTS" (color per Architects selection from full range of standard colors)
- D. Type D - Neutral-Curing Silicone Sealant: One part medium modulus neutral-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
1. Dow Corning Corp., "Dow Corning 899".
 2. General Electric Co., "SSG 4000AC Ultraglaze".
 3. Tremco, Inc., "Spectrum 3".
 4. Pecora Corp., "895NST".
- E. Type E - One-Part Mildew-Resistant Silicone Sealant: Complying with ASTM C920, Type S, Grade NS, Class 25.
1. Dow Corning Corp., "Dow Corning 791".
 2. General Electric Co., "SCS 1700 Sanitary".
 3. Tremco, Inc., "Proglaze" (color per Architects selection from full range of standard colors)
 4. Pecora Corp., "860" or "894NST" (color per Architects selection from full range of standard colors)
- F. Type F - Multi-Part Pourable Sealant: Complying with ASTM C920, Type M, Grade P, Class 25. Shore A hardness +40.
1. Tremco, Inc., "Vulkem 45SSL".
 2. Pecora Corp., "Dynatred" or "Urexpan NR-200".
 3. W.R. Meadows, "Pourthane SL".

- G. Type G - Acoustical Sealant: Nondrying, nonhardening permanently flexible conforming to ASTM D217.
 - 1. Pecora Corp., "BA-98 Acoustical Sealant"
 - 2. Tremco, Inc., "Tremco Acoustical Sealant".
 - 3. United States Gypsum Co., "Sheetrock Acoustical Sealant".

2.4 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 joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
- D. Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width
- E. Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with manufacturers and document requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Beginning of installation means installer accepts existing substrate.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions 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 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 after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include examples of the following:
 - a. Asphalt
 - b. Concrete.
 - c. Masonry
 - d. Unglazed surfaces of ceramic tile.
 - e. Exterior insulation and finish systems such as plaster or stucco.
- B. Remove laitance and form-release agents from concrete.
 - 1. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include examples of the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Perform preparation in accordance with ASTM C1193.
- E. Protect elements surrounding the Work of this Section from damage or disfiguration
Joint Priming:
- F. Prime joint substrates, where recommended in written form by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written

instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- G. Joint Priming: Prime joint substrates, where recommended in written form by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces
- H. 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.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
 4. Provide flush joint profile according to Figure 8B in ASTM C 1193.
 5. Provide recessed joint configuration of recess depth according to Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- H. Installation of Preformed Tapes: Install according to manufacturer's written instructions.
- I. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- J. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants 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 installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT LOCATION SCHEDULE

SCHEDULE

| Type | Location | Color |
|---|--|---|
| Type A - Acrylic Latex Cure | All interior joints not otherwise scheduled | To match adjacent surfaces |
| Type B - Butyl | Under thresholds | Black |
| Type C - One-Part Nonacid Curing Silicone | Exterior door, entrance & window frames. Exterior & Interior metal flashing. | To match adjacent material. |
| Type D - Neutral-Curing Silicone | Joints within glass and glazing | Translucent |
| Type E - Mildew-Resistant Silicone | Interior joints in ceramic tile and at plumbing fixtures | To match adjacent material, translucent |
| Type F - Multi-part Pourable Urethane | Exterior & interior joints in horizontal surfaces of concrete; between metal & concrete masonry and mortar | To match adjacent material |
| Type G - Acoustical Sealant | In sound rated walls between stud track/runner and adjacent construction. Between outlet | Translucent |

| Type | Location | Color |
|--|--|-------|
| Type H - Sound and Fire Protective Rated Moldable Putty Pads | boxes and gypsum board. At fire-rated wall openings when code required, such as electric boxes. In sound rated walls at electric boxes. | Red |

END OF SECTION 07 92 00

SECTION 08 11 00 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Standard hollow metal doors and frames.
- B. Related Sections
 - 1. Division 7 Section "Flexible Sheet Flashing" for flashing windows, door, and other openings.
 - 2. Division 9 Section "Painting" for field painting hollow metal doors and frames.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.
- B. Other Action Submittals:
 - 1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference designation for details and openings as those on Drawings. Coordinate with door hardware schedule.
 - a. Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - b. Indicated specific model number of door and frame.

- c. Indicate steel sheet type (galvanized, non-galvanized, etc.)
- d. Indicate door and frame type (A, A1, B, C, etc.)
- e. Indicated hardware group.
- f. Indicate dimensions and locations of mortises and holes for hardware.
- g. Indicate dimensions and locations of cutouts.
- h. Indicate fire ratings for fire doors.

- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 QUALITY ASSURANCE

A. Reference Standards:

1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2020 NEC, as Amended by CA)
5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
7. Title 24 CCR, Part 6 - 2022 California Energy Code
8. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
9. Title 24 CCR, Part 10 - 2022 California Existing Building Code
10. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)
11. Title 24 CCR, Part 12 - 2022 California Reference Standards (Partial List)
12. Americans with Disabilities Act (ADA), Title II or Title III.

- B. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

- C. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch-high wood blocking. Do not store in a manner that traps excess humidity.
 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of steel doors and frames that fails in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 2. Warranty Period: 2 years.
- B. Installer's Warranty: 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Steel Doors and Frames: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
 - 1. Steelcraft; an Ingersoll-Rand company. (Basis of Design)
 - 2. Ceco Door Products; an Assa Abloy Group company.
 - 3. Curries Company; an Assa Abloy Group company.
 - 4. Or equal (Reference substitution requirements in Section 01 25 10).

2.2 MATERIALS

- A. Galvannealed (Metallic-Coated) Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum A60 metallic coating for exterior doors and frames.
- B. Frame Anchors: ASTM A 591, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008 or ASTM A 1011, hot-dip galvanized according to ASTM A 153, Class B.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.
- D. Powder-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 hollow metal frames of type indicated.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
 - 1. Design: Flush panel.
 - 2. Gauge: 16GA
 - 3. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
 - a. Fire Door Core: As required to provide fire-protection indicated.
 - 4. Vertical Edges for Single-Acting Doors: Beveled edge.
 - a. Beveled Edge: 1/8 inch in 2 inches.
 - 5. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.

6. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
 7. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
 8. Vision, Narrow Lite, Half Glass Doors: Size as indicated on Drawings.
- B. Exterior Doors: Face sheets fabricated from galvanized (metallic-coated) steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush):
 - a. Face thickness: 16 gage (0.053 inch).
 - 1) Product: Series L16 by Steelcraft. (Basis of Design)
 - 2) Or Approved Equal.
- C. Interior Doors: Face sheets fabricated from galvanized (metallic-coated) steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush):
 - a. Face thickness: 18 gage (0.053 inch).
 - 1) Product: Series L16 by Steelcraft. (Basis of Design)
 - 2) Or Approved Equal.
- D.
- E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior and Interior Door Frames: Fabricated from metallic-coated steel sheet.
1. Fabricate door frames with mitered or coped corners.
 2. Fabricate door frames as full profile welded unless otherwise indicated.
 3. Exterior and Interior Frame: 14 gage (0.067-inch) thick steel sheet.
 - a. Product: F14 Series by Steelcraft.
 - b. Or Approved Equal.
 4. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.5 HOLLOW METAL WINDOW FRAMING SYSTEMS

- A. Acceptable Product: Steelcraft Architectural FN-series (Stick) Systems
- B. Components: Construct architectural stick frame assemblies of standard frame components, fabricated as specified.
- C. Interior Frames in stud wall construction: 16 gage (1.3 mm) cold rolled steel, ASTM A 1008/A 1008M steel.
- D. Include galvanized components and internal reinforcements with galvanized frames.

2.6 FRAME COMPONENT REQUIREMENTS:

- A. Fabricate frame assemblies from three basic components:
 - 1. Open Sections (perimeter members) identical in configuration to standard frames.
 - 2. Closed sections (intermediate members) with identical jamb depth, face dimensions, and stops as open sections.
 - 3. Sill sections: Fabricated from galvanized steel, flush with both faces of adjacent vertical members. Cut individual components to length and notched to assure square joints and corners.
- B. Externally welded face joints at meeting mullions or between mullions and other frame members on the face surfaces only. Grind and finish face joints smooth.
- C. Fabricate frame assemblies for shipment to the jobsite completely welded.
 - 1. Field joints permissible only when the size of the total assembly exceeds shipping limitations.
 - 2. Fabricate oversized frames in sections designated for splicing in the field.
 - 3. Provide frames with joint reinforcements 14 gage (1.7 mm), 8 inches (203 mm) long.
 - 4. Field weld joint reinforcement inside and tack weld outside joint at both faces, grind, and finish smooth and uniform in appearance, after installation.
- D. Pierced and dimpled glazing beads for use with manufacturers' standard fasteners.
- E. Provide necessary anchors for jambs, heads, and sills of assemblies.
- F. Verify field dimensions as required. Do not begin fabrication until these dimensions have been verified, and approved.

2.7 ACCESSORIES:

- A. Glazing Bead: Formed steel sheet; screw-attached.
 - 1. Glazing Bead: Formed steel sheet; snap-in installation.

2.8 FINISH

- A. Factory prime finish in accordance with ANSI A 250.10.

2.9 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fastener.

2.12 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for glazed lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.13 LOUVERS

- A. Provide louvers for doors, where indicated, that comply with SDI 111C.
- B. Inserted Louver: (non-fire rated)
 - a. 18 gage steel, welded to fabricated sub-frame.
 - b. 1-inch-thick, inverted "Y" blade type, inserted into opening prepared in door faces.
 - c. Free air space: 50% of louver area.
 - d. Product: L-219 (24 by 24 inches) by Steelcraft. (Basis of design)
 - e. Or Approved Equal

2.14 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- wide steel.
- C. Provide Screw-In Top Cap for exterior doors.

2.15 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances:
 - a. Standard doors and frames: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 - 2. Glazed Lites: Factory cut openings in doors.
 - 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

6. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - b. Three anchors per jamb up to 60 inches high.
 - c. Four anchors per jamb from 60 to 90 inches high.
 - d. Five anchors per jamb from 90 to 96 inches high.
 - e. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - f. Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
 - g. Compression Type: Not less than two anchors in each jamb.
 - h. Post installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."
 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive non-templated, mortised and surface-mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

4. Provide loose stops and moldings on inside of hollow metal work.
 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
- H. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA 101/I.S.2/NAFS, Air Infiltration Test.
1. Maximum Rate: 0.1 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft.

2.16 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Field-Applied Paint Finish: Comply with Division 9 Section "Painting".

3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

- C. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - 2. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - 3. Install frames with removable glazing stops located on secure side of opening.
 - 4. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - 5. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - 6. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.
 - 7. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
 - 8. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 9. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to

- provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
10. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 11. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 12. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 13. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 14. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
- D. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 11 00

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SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following interior gypsum board:
 - 1. Type X (GWB).
 - 2. Sound Control Gypsum Board (GWB-STC)
 - 3. Abuse Resistant (GWB-VHI).
 - 4. Abuse and Water Resistant (GWB-WR).
- B. Related Sections include the following:
 - 1. Division 6 Section "Rough Carpentry" for wood framing and furring that supports gypsum board.
 - 2. Division 9 Section "Finish Schedule" for color selection.
 - 3. Division 9 Section "Ceramic Tile" for cementitious backer board installed as substrates for ceramic tile.
 - 4. Division 9 Section "Painting" for primers and finishes applied to gypsum board surfaces.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
 - 2. Finishes: Provide Level 4 and 5 of gypsum board finish indicated for use in exposed locations. 4 by 4 foot sample of each.
 - a. Finishes: For each finish indicated and on same backing indicated for Work.

1.4 QUALITY ASSURANCE

- A. Reference Standards:

1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
 2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2017 NEC, as Amended by CA)
 5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
 6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
 7. Title 24 CCR, Part 6 - 2022 California Energy Code
 8. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
 9. Title 24 CCR, Part 10 - 2022 California Existing Building Code
 10. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)
- B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency acceptable to DSA.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- D. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each finish indicated.
 - c. Each areas such as walls, ceilings, and soffits.
 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 3. Simulate finished lighting conditions for review of mockups.
 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of gypsum board that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 1 year.
- B. Installer's Warranty: 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Interior Gypsum Board: Subject to compliance with requirements, provide products by one of the following:
 - 1. USG Corporation.
 - 2. National Gypsum Company.
 - 3. G-P Gypsum.
 - 4. Or equal (Reference substitution requirements in Section 01 25 10)
- B. Sound Control Wall Board: Subject to compliance with requirements, provide products by one of the following:

1. Pabco Corporation.
2. Certainteed
3. Gold Bond
4. Or equal (Reference substitution requirements in Section 01 25 10)

C. Steel Trim Accessories: Subject to compliance with requirements, provide products by one of the following:

1. Amico.
2. Or equal (Reference substitution requirements in Section 01 25 10)

2.2 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36 or ASTM C 1396, as applicable to type of gypsum board indicated and whichever is more stringent.

B. Type X:

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

C. Water-Resistant Gypsum Backing Board: ASTM C 630 or ASTM C 1396.

1. Core: 5/8 inch, Type X.
2. Use: Toilet rooms and janitor's closets walls with painted finish.
3. Products:
 - a. SHEETROCK Brand Water-Resistant Firecode Core Gypsum Panels by USG.
 - b. Gold Bond Brand Moisture-Resistant Fire Resistant Gypsum Board by National Gypsum.Or equal (Reference substitution requirements in Section 01 25 10)
4. When Water-Resistant Gypsum Backing Boards are not available (gradual phasing out by manufacturers), provide Moisture- and Mold-Resistant Type X: With moisture - and mold-resistant core and surfaces.
 - a. SHEETROCK Brand HUMITEK by USG.
 - b. XP Wallboard by National Gypsum.
 - c. DensArmor Interior Guard by G-P.
5. Or equal (Reference substitution requirements in Section 01 25 10)

D. Sound Control Gypsum Board

1. Manufactured to ASTM C1278 material standards.

2. Core: 5/8 inch, Type X.
 3. Products:
 - a. Sound Break XP by Goldbond (Basis of Design)
 - b. Quietrock by Pabco.
 - c. Silent FX by Certainteed
 4. Type and Thickness: Type X, 5/8 inch thick.
- E. Impact Resistant Type: ASTM C1278 and ASTM C1629.
1. Core: 5/8 inch, Type X.
 2. High-density paperless gypsum and cellulose wall panels with long edges.
 3. Products:
 - a. FIBEROCK Brand VHI panels by USG.
 - b. Hi-Impact XP Wallboard by National Gypsum.
 4. Or equal (Reference substitution requirements in Section 01 25 10)
- F. Fiber-Reinforced Gypsum Board:
1. Manufactured to ASTM C1278 material standards.
 2. Product: Fiberock Brand Aqua-Tough Panel by USG Corp. (Basis of Design)
 3. Type and Thickness: Type X, 5/8 inch thick.
 4. Description: Abuse resistant, water resistant, mold resistant, fire resistant, environmentally friendly (made from 95% recycled materials), smooth paintable surface.
 5. Stud Spacing: Up to 24 inches on center on ceilings with Type X, 5/8 inch thick.
 6. Use:
 - a. On ceilings over sheet waterproofing and with epoxy painted finish.
 - b. Toilet rooms and janitor's closets ceilings with epoxy painted finish.

2.4 TRIM ACCESSORIES

- A. Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Casing bead; J-shaped; exposed long flange receives joint compound
 - g. Expansion (control) joint.
 - h. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape: Paper.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- C. Acoustical Sealant: Sheetrock Acoustical Sealant by USG or equal.
- D. Thermal and Acoustical Insulation: As specified in Division 7 Section "Building Insulation."
- E. Gypsum Board Adhesives: High performance latex-based construction adhesive designed for gypsum board applications.
 - 1. Green Series SW-325 Shear & Drywall Adhesive by OSI.
 - 2. Drywall Adhesive GDWA by Grabberman.
 - 3. Or equal (Reference substitution requirements in Section 01 25 10)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Notify Inspector of Record 48 hrs in advance of when coats of mud are being applied to confirm correct coats.
- C. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- F. Form control and expansion joints with space between edges of adjoining gypsum panels.
- G. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless 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. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- H. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

3.3 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use where indicated.
 - 4. U-Bead: Use at exposed panel edges.
 - 5. Casing Bead: Provide at edges of Gyp. Bd. where material changes occurs or when gyp. bd. butt to windows and/or doors to provide a straight and level finished edge.
 - 6. Expansion (control) joint.
 - 7. Curved-Edge Cornerbead: Use at curved openings.

3.4 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Comply with GA 214 for Level definitions.
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for ceramic tile or acoustical tile.
 - 3. Level 3: Where indicated on Drawings.
 - 4. Level 4: At panel surfaces that will be exposed to view with flat paint finish.
 - a. Primer and its application to surfaces are specified in other Division 9 Sections.
 - 5. Level 5: At panel surfaces that will be exposed to view with non-flat paint finish.
 - a. Primer and its application to surfaces are specified in other Division 9 Sections.

3.5 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 25 00

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SECTION 09 30 13 - CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Ceramic floor and wall tile.
 - 2. Porcelain Tile.
 - 3. Tile trims.
 - 4. Grout.
 - 5. Solid polymer thresholds installed as part of tile installations.
 - 6. Waterproof membrane for tile installations.
 - 7. Cementitious backer units installed as part of tile installations.
- B. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
 - 2. Division 9 Section "Gypsum Board" for moisture resistant gypsum board.
 - 3. Division 9 Section "Finish Schedule" for color selection.

1.3 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. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

1.4 SYSTEM DESCRIPTION

- A. Ground and Floor Surfaces:
 - 1. Minimum 0.6 static coefficient of friction under wet conditions per ADAAG A4.5.1. and ASTM D2047.

1.5 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.6.
 - 2. Step Treads: Minimum 0.6.
 - 3. Ramp Surfaces: Minimum 0.8.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. 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.
 - 1. Propose locations of expansion, contraction, control, and isolation joints if not indicated on Drawings.
- C. Installation Method: Show TCA installation method number for each tiled area in tabulated form.
- D. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- E. Product Certificates: For each type of product, signed by product manufacturer.
- F. Qualification Data: For Installer.
- G. Material Test Reports: For each tile-setting and -grouting product.

1.7 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
 - 2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 - 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 - 4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2017 NEC, as Amended by CA)
 - 5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
 - 6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)

7. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA
 8. Title 24 CCR, Part 10 - 2022 California Existing Building Code
 9. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)
 10. Title 24 CCR, Part 12 - 2022 California Reference Standards (Partial List)
 11. Americans with Disabilities Act (ADA), Title II or Title III.
- B. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- D. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
- 1.8 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 requirement in ANSI A137.1 for labeling sealed tile packages.
 - B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- 1.9 PROJECT 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.
- 1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of ceramic tile and accessories that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 1 year.
- B. Installer's Warranty: 1 year.

1.11 EXTRA MATERIALS

- A. Furnish extra materials described below that match 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Ceramic Tile: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - 1. Daltile; Div. Dal-Tile International Corp.
 - 2. American Olean
 - 3. Or approved equal, (See 01 60 00 for substitution requirement)
- B. Porcelain Tile: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - 1. Daltile; Div. Dal-Tile International Corp.
 - 2. American Olean
 - 3. Or approved equal, (See 01 60 00 for substitution requirement)
- C. Solid-Polymer Thresholds: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - 1. Avonite, Inc.
 - 2. DuPont Polymers.
 - 3. Formica Corporation.
 - 4. Nevamar; International Paper; Decorative Products Division.
 - 5. Or equal (Reference substitution requirements in Section 01 60 00).
- D. Setting, Grouting, and Waterproofing Materials: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - 1. Custom Building Products.

2. LATICRETE International Inc.
 3. MAPEI Corporation.
 4. Or equal (Reference substitution requirements in Section 01 60 00).
- E. Sheet Waterproofing for Tile Installation: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
1. Schluter; KERDI. (Basis of Design)
 2. Noble Company (The); Nobleseal TS
 3. Or equal (Reference substitution requirements in Section 01 60 00).
- F. Cementitious Backer Board: Subject to compliance with requirements, provide products by one of the following manufacturers.
1. USG Corporation; DUROCK Cement Board.
 2. National Gypsum Company; PermaBase.
 3. C-Cure; C-Cure Board 990.
 4. Custom Building Products; Wonderboard.
 5. Or equal (Reference substitution requirements in Section 01 60 00).

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
1. Provide tile complying with Standard grade requirements.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
1. Colors: As scheduled on the Finish Schedule shown in the plans.
 2. Floor colors:
 - a. As specified by Architect.
 3. Walls N/A
- D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, 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.

2.3 TILE PRODUCTS

- A. As scheduled on the "Finish Schedule" noted in the plans.

2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
- B. Solid Polymer Thresholds: Made from homogeneous solid sheets of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 5 or Type 6, without precoated finish.

2.5 SHEET WATERPROOFING FOR TILE INSTALLATIONS

- A. General: Manufacturer's standard product that complies with ANSI A118.10.
- B. Thin (1/32 inch) bonded, load bearing sheet membrane for waterproofing. Alloy made from Chlorinated Polyethylene (CPE) with nonwoven fabric laminated to both sides.
 - 1. System Performance: 1-14 "Extra Heavy Service" cycles per ASTM C627.
 - 2. Hardness: 82 shore A per ASTM D2240.
 - 3. Tensile Strength: 1600 psi per ASTM D412 Die C.
 - 4. Elongation: 44% per ASTM D412 Die C.
 - 5. Tear Strength: 400 psi per ASTM D624 Die C.
 - 6. Shear Strength: Pass per ANSI A118.10-1993.
 - 7. Shear Strength - Water Immersion: Pass per ANSI A118.10-1993.
 - 8. Fungus & microorganism Resistance: Pass per ANSI A118.10-1993.
 - 9. Seam Strength: Pass per ANSI A118.10-1993.
 - 10. Waterproofness: Pass per ANSI A118.10-1993.

2.6 FLUID-APPLIED WATERPROOFING AND CRACK SUPPRESSION FOR TILE INSTALLATIONS

- A. General: Manufacturer's standard product that complies with ANSI A118.10.
- B. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and fabric reinforcement.

2.7 SETTING AND GROUTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:
1. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
 2. Latex Additive: Manufacturer's standard water emulsion.
 3. Products:
 - a. MAPEI, Mapecem 102, Powder, MAPEI, Planicrete AC (Liquid).
 - b. 3701 (liquid) Additive with 226 (powder) by Laticrete.
 - c. Custom Building Products: Acrylic Mortar Admix
 - d. Or equal.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
1. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
 - a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
 2. Products:
 - a. MAPEI: Ultraflex 2, Walls: MAPEI Ultralite.
 - b. 254 Platinum by Laticrete.
 - c. Custom Building Products: MegaFlex.
 - d. Or equal.

2.8 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."
1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

2.9 CEMENTITIOUS BACKER UNITS

- A. Properties:
1. Aggregated portland cement board with coated glass-mesh reinforcement scrim.
 2. Comply with ANSI A118.9.
 3. Pass ASTM E136 for non-combustibility.

4. Thickness: As indicated on Drawings.
5. Lengths: Maximum lengths available to minimize end-to-end butt joints.

2.10 MOISTURE AND MOLD-RESISTANT GYPSUM BOARD

- A. Comply with requirements of Division 9 Section "Gypsum Board".
- B. Substrates for painted surfaces in toilet rooms. Do not use as substrate for tile application.

2.11 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments 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-shape, 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.
- D. Grout Sealer: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

2.12 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

3.1 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 installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
 - a. Sub-floor and Vertical Surfaces: 1/4 inch in 10 feet.
 - 2. 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 before installing tile.
 - 3. 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.

3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors installed with mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, 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.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. 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.
- D. 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.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
- H. Grout tile to comply with requirements of the following tile installation standards:
 - 1. For chemical-resistant epoxy grouts, comply with ANSI A108.6.

3.4 CEMENTITIOUS BACKER UNIT INSTALLATION

- A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

- C. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
- B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.
- B. Joint Widths: 1/16 inch unless specified otherwise.
- C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
- D. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.7 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile on walls with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/16 inch.
 - 2. Glazed Wall Tile: 1/16 inch.

3.8 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove epoxy 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. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.9 FLOOR TILE INSTALLATION, TCA ASSEMBLY

- A. Tile Installation: Interior floor installation on concrete; cement mortar bed (thickset) bonded to concrete; TCA F112 and ANSI A108.1A.
 - 1. Grout: Chemical-resistant, water-cleanable, tile-setting and -grouting epoxy.

3.10 WALL TILE INSTALLATION, TCA ASSEMBLY

- A. Tile Installation: Interior wall installation over waterproof membrane, cementitious backer units; thin-set mortar; TCA W244F-07 and ANSI A108.5.
 - 1. Grout: Chemical-resistant, water-cleanable, tile-setting and -grouting epoxy.

END OF SECTION 09 30 13

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SECTION 09 65 00 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Resilient sheet flooring.
- B. Resilient tile flooring.
- C. Resilient base.
- D. Installation accessories.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. TITLE 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 - 2. TITLE 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 - 3. TITLE 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2020 NEC, as Amended by CA)
 - 4. TITLE 24 CCR, Part 6 - 2022 California Energy Code
 - 5. TITLE 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
 - 6. TITLE 24 CCR, Part 12 - 2022 California Reference Standards
 - 7. Title 19 C.C.R., Public Safety, SFM Regulations.
 - 8. 2010 ADA Standards for Accessible Design
 - 9. Americans with Disabilities Act (ADA), Title II or Title III.

1.3 SUBMITTALS

- A. See Section 01 33 00 - 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. Shop Drawings: Indicate seaming plan.

- D. Verification Samples: Submit two samples, 12 X 12 inch in size illustrating color and pattern for each resilient flooring product specified.
 - E. Concrete Testing Standard: Submit a copy of ASTM F710.
 - F. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.
 - G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
 - H. LEED Report: Report recycled content and VOC emission of flooring; VOC content of adhesives.
 - 1. For linoleum flooring, report rapidly-renewable content and urea-formaldehyde content.
 - I. Maintenance Materials: Furnish the following for College District's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 25 square feet of each type and color.
 - 3. Extra Wall Base: 50 linear feet of each type and color.
- 1.4 DELIVERY, STORAGE, AND HANDLING
- A. Store tiles as recommended by manufacturer.
 - B. Protect roll materials from damage by storing on end.
- 1.5 FIELD CONDITIONS
- 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.
- 1.6 REGULATORY REQUIREMENTS
- A. Resilient Flooring demonstrating a coefficient of friction of at least 0.6 per ASTM C1028 shall be accepted as meeting the intent of slip resistance. CBC Section 1124B.1.

PART 2 - PRODUCTS

2.1 SHEET FLOORING

- A. Rubber Sheet Flooring (RF-3): 100 percent rubber composition, color and pattern through total thickness:
1. VOC Content: Certified as Low Emission by one of the following:
 - a. GreenGuard Children and Schools; www.greenguard.org.
 - b. SCS Floorscore; www.scscertified.com.
 2. Total Thickness: 0.125 inch minimum.
 3. Sheet Width: 76 inch minimum.
 4. Design: Flat.
 5. Pattern: speckled.
 6. Manufacturers:
 - a. Basis of Design: Mondo, Product as indicated on Color Schedule on drawings.
 - b. Acceptable Manufacturers that comply with these requirements:
 - 1) Johnsonite, Inc: www.johnsonite.com.
 - 2) PRF USA, Inc: www.rubberfloors.com.
 - c. Substitutions: (Reference substitution requirements in Section 01 25 10)
- B. Linoleum Sheet Flooring (RF-2): Homogeneous wear layer bonded to backing, with color and pattern through wear layer thickness:
1. Minimum Requirements: Comply with ASTM F2034, Type corresponding to type specified.
 2. VOC Content: Certified as Low Emission by one of the following:
 3. Backing: Jute fabric.
 4. Wear Layer Thickness: 0.080 inch, minimum, excluding backing.
 5. Pattern: Solid color.
 6. Seams: Heat welded.
 7. Manufacturers:
 - a. Basis of Design: See Color Schedule on drawings
 - b. Armstrong World Industries, Inc: www.armstrong.com.
 - c. Forbo Linoleum, Inc; Product As indicated on Color Schedule: www.forbo-industries.com.
 - d. Tarkett Inc: www.tarkett.com.
 - e. Substitutions: (Reference substitution requirements in Section 01 60 00).
- C. Vinyl Plank Flooring; color and pattern through total thickness
1. VOC Content: Certified as Low Emission by one of the following:
 - a. GreenGuard Children and Schools; www.greenguard.org.
 - b. SCS Floorscore; www.scscertified.com.
 2. Total Thickness: 0.160 inch minimum.

3. Tile Width: 6 inch minimum.
 4. Tile Length: 48"
 5. Design: Flat.
 6. Pattern: wood. Colors to be selected by Architect from full range of manufacturers colors.
 7. Manufacturers:
 - a. Basis of Design: Armstrong Luxury Plank Tile Product as indicated on drawings.
 - b. Acceptable Manufacturers that comply with these requirements:
 - 1) Shaw, Inc: www.shawfloor.com.
 - c. Substitutions: (Reference substitution requirements in Section 01 60 00).
- D. Linoleum Welding Rod: Solid color linoleum produced by flooring manufacturer for heat welding seams, in color in color matching predominant flooring color.

2.2 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
1. Height: 4 inch.
 2. Thickness: 0.125 inch thick.
 3. Finish: Satin.
 4. Color: Color as selected from manufacturer's standards.
 5. Manufacturers:
 - a. Basis of Design: Roppe; Product as indicated on Color Schedule on drawings.
 - b. Acceptable Manufacturers that comply with these requirements:
 - 1) Burke Flooring: www.burkemercer.com.
 - 2) Johnsonite, Inc: www.johnsonite.com.
 - 3) Substitutions: Reference substitution requirements in Section 01 60 00.

2.3 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
1. Provide only products having lower volatile organic compound (VOC) content than required by the South Coast Air Quality Management District Rule No. 1168.
- C. Moldings, Transition and Edge Strips: Same material as flooring.

- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
 - 1. Test in accordance with Section 09 05 61.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location

3.2 PREPARATION

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- I. Install flooring in recessed floor access covers, maintaining floor pattern.

3.4 SHEET FLOORING

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Layout seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.
- B. Double cut sheet at seams.
- C. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.
- D. Finish seams in linoleum by heat welding.

3.5 RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.6 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.

3.7 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 09 65 00

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SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F more than 95 deg F, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Floor Score Compliance: Resilient base shall comply with requirements of Floor Score certification.
- B. Low-Emitting Materials: Flooring system 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."

2.2 THERMOSET-RUBBER BASE

- A. 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
 - 1. Burke Mercer Flooring Products, Division of Burke Industries Inc.

2. Flexco.
 3. Roppe Corporation, USA
 4. Or equal.
- B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
1. Style and Location:
 - a. Style B, Cove: Provide in restrooms.
- C. Thickness: 0.125 inch.
- D. Height: As indicated on Drawings.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed
- G. Inside Corners: Job formed
- H. Colors: As selected by Architect from full range of industry colors.

2.3 THERMOPLASTIC-RUBBER BASE

- A. 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:
1. AB; American Biltrite.
 2. Allstate Rubber Corp.
 3. Armstrong World Industries, Inc.
 4. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 5. Johnsonite; A Tarkett Company.(SLCUSD STANDARD)
 6. Mondo Rubber International, Inc.
 7. Nora Systems, Inc.
 8. Roppe Corporation, USA.
 9. VPI, LLC, Floor Products Division.
 10. Or equal.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
1. Group: I (solid, homogeneous)
 2. Style and Location:
 - a. Style B, Cove: Provide in restrooms.

- C. Thickness: 0.125 inch
- D. Height: As indicated on Drawings
- E. Lengths: Coils in manufacturer's standard length
- F. Outside Corners: Job formed
- G. Inside Corners: Job formed
- H. Colors: As selected by Architect from full range of industry colors.

2.4 VINYL BASE

- A. 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:
 - 1. Armstrong World Industries, Inc.
 - 2. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 - 3. Flexco.
 - 4. Johnsonite; A Tarkett Company.
 - 5. Roppe Corporation, USA.
 - 6. VPI, LLC, Floor Products Division.
 - 7. Or equal.
- B. Product Standard: ASTM F 1861, Type TV (vinyl, thermoplastic).
 - 1. Group: I (solid, homogeneous)
 - 2. Style and Location:
 - a. Style B, Cove: Provide in restrooms.
- C. Minimum Thickness: 0.125 inch
- D. Height: As indicated on Drawings.
- E. Lengths: Coils in manufacturer's standard length
- F. Outside Corners: Job formed
- G. Inside Corners: Job formed
- H. Colors and Patterns: As selected by Architect from full range of industry colors.

2.5 RUBBER MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Roppe Corporation, USA.
 - 2. VPI, LLC, Floor Products Division
 - 3. Or equal. See Section 01 60 00 for substitution requirements
- B. Description: Rubber cap for cove resilient flooring, nosing for resilient flooring, reducer strip for resilient flooring, transition strips.
- C. Profile and Dimensions: As indicated.
- D. Locations: Provide rubber molding accessories in areas indicated on the plans
- E. Colors and Patterns: As selected by Architect from full range of Manufacturers standard.

2.6 VINYL MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 - 3. Flexco.
 - 4. Johnsonite; A Tarkett Company.
 - 5. Roppe Corporation, USA.
 - 6. Or equal. See Section 01 60 00 for substitution requirements
- B. Description: Vinyl for cove resilient flooring, nosing for resilient flooring, reducer strip for resilient flooring, transition strips.
- C. Profile and Dimensions: As indicated.
- D. Locations: Provide vinyl molding accessories in areas indicated.
- E. Colors and Patterns: As selected by Architect from full range of Manufacturers standard.

2.7 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
 - 1. Base Adhesive Product: Subject to compliance with requirements, provide by one of the following:
 - a. Armstrong Wall base adhesive: Part #S-725
 - b. TEC® Premium Cove Base Adhesive (TA-714), premium adhesive for the installation of rubber, vinyl, or Thermoplastic Rubber (TPR).
 - c. Or approved equal, See Section 01 60 00 for substitution requirements
 - 2. Adhesives shall have a VOC content of 50 g/L or less.
 - 3. 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."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 70 00 - FIBER REINFORCED PLASTIC PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fiber reinforced plastic panel system for adhesive mounting.
 - 2. Moldings, adhesive, and joint sealants.
- B. Related Sections:
 - 1. Division 9 Section "Finish Schedule" for color selection.
 - 2. Division 9 Section "Ceramic Tile" for coved base.

1.3 SUBMITTALS

- A. 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.
- B. Selection Samples: For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns. Include 2 sets of all trim pieces that the manufacturers provide in colors available.
- C. Maintenance Instructions.

1.4 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
 - 2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 - 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA
 - 4. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 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 absolute limits.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fiber reinforce plastic panels that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 2 years.
- B. Installer's Warranty: 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Fiber Reinforced Plastic Panels: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
 - 1. Fiber Reinforced Plastic (FRP) panels by Marlite (Basis of Design)
 - 2. Kemlite.
 - 3. Glasteel.
 - 4. Or equal (Reference substitution requirements in Section 01 25 10)

2.2 PANEL SYSTEM

- A. Plastic Panel System: Factory finished panels, trim, sealant, and accessories.
- B. Panels: Marlite FRP Panels; fiberglass reinforced polyester, USDA approved for incidental food contact.
 - 1. Color and pattern to be: Standard FRP selected from the manufacturers standard.

2. Surface Burning Characteristics: Flame spread index of 200 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84 (Class C/III).
 3. Surface Texture: smooth
 4. Thickness: 3/32 inch, nominal.
 5. Width: 48 inches.
 6. Height: 72 inches
 7. Flexural Strength: 17,000 psi, when tested in accordance with ASTM D 790.
 8. Flexural Modulus: 600,000 psi, when tested in accordance with ASTM D 790.
 9. Tensile Strength: 8,000 psi, when tested in accordance with ASTM D 638.
 10. Tensile Modulus: 9,430 psi, when tested in accordance with ASTM D 638.
 11. Impact Resistance: 7 ft-lb/in, when tested in accordance with ASTM D 256, Izod method.
 12. Coefficient of Thermal Expansion: 0.0000157 in/in/degree F, measured in accordance with ASTM D 696.
 13. Water Absorption: 0.17 percent, when tested in accordance with ASTM D 570.
 14. Specific Gravity: 1.53, when tested in accordance with ASTM D 792.
- C. Panel Trim: Extruded PVC, in manufacturer's standard colors.
1. Outside corners, inside corners, edge trim, bottom (coved) trim for sealing tight to fixtures and division molding.
- D. Sealant: Marlite Silicone Sealant; gunnable silicone rubber; clear.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Take panels out of cartons and allow to acclimatize to room conditions for at least 48 hours prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
- D. Protect existing surfaces from damage due to installation.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Use the adhesives recommended by the panel manufacturer unless prohibited by local regulations; obtain manufacturer's approval of alternative adhesives.
- C. Install continuous bead of silicone sealant in each joint and trim groove and between trim and adjacent construction, maintaining 1/8 inch expansion space.
- D. Avoid contamination of panel faces with adhesives, solvents, or cleaners; clean as necessary and replace if not possible to repair to original condition.
- E. Protect installed products until completion of project.
- F. Touch-up, repair or replace damaged products after Substantial Completion.

END OF SECTION 09 70 00

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Surface Preparation.
 - 2. Field application of paints, stains, varnishes, and other coatings (PTG, PTS).
 - 3. Schedules and Interior Elevations on the Contract Documents for finished surfaces.
- B. Related Sections:
 - 1. Finish Schedule on the Contract Documents.

1.3 SUBMITTALS

- 1. Product data - Submit product data sheets for each product.
- 2. Samples:
 - a. Submit three painted samples (brush outs), illustrating selected colors and textures for each color and systems selected with specified coats cascaded.
 - b. Submit on suitable backing, 8x10 inch size.

1.4 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
 - 2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 - 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 - 4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2017 NEC, as Amended by CA)
 - 5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)

6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
7. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
8. Title 24 CCR, Part 10 - 2022 California Existing Building Code
9. Title 24 CCR, Part 12 - 2022 California Reference Standards (Partial List)
10. 2010 ADA Standards for Accessible Design
11. Americans with Disabilities Act (ADA), Title II or Title III.

1.5 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.

1.6 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.
- C. Environment Requirements:
 1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be stored and applied.
 2. Stucco: Provide a PH test of the stucco that shows compliance with PH requirements of the paint manufacturer. Do not apply paint to stucco at PH levels over 10 or the max amount recommended by the paint manufacturer, whichever is less.
 3. Do not paint when there is a threat of rain within 24 hours or when surface or air temperatures are at or below 40 degrees.
 4. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control measure, as shown in Table 5.504.4.3, unless more stringent local limits apply. The VOC Content limit for coatings that do not meet the definitions for specialty coatings categories listed in Table 5.504.4.3 shall be determined by classifying the coating as a Flat, Non-flat or non-flat high gloss coating based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board, suggested Control Measure, and the corresponding Flat, Non-flat or Non-flat-High gloss VOC limit

on Table 5.504.4.3 shall apply. *"TABLE 5.504.4.3-VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS"*

5. Aerosol paints and coatings shall meet the PWMIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on the use of certain toxic compounds and ozone depleting substances. In Sections 94522(c)(2) and (d)(2) of the California Code of Regulations, Title 17, commencing with Section 94520 and in areas under the jurisdiction of the Bay Area Air Quality Management District, (additionally) comply with the percent VOC by weight of product limits of Regulation 8 Rule 49. *"TABLE 5.504.4.3-VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS"*

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace paint that fails in materials or workmanship within specified warranty period.
 1. Warranty Period: 1 year.
- B. Installer Warranty: 1 year.

1.8 EXTRA STOCK

- A. Provide following with District's permission:
 1. Minimum 2 gallons of each product and each color in an original unopened or new 1 gallon cans.
 - a. Color spot each lid.
 - b. Identify with formula, location, product and date on the lid.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Paints:
 1. Dunn-Edwards Corp. (Basis of Design).
 2. Sherwin Williams
 3. Or equal (Reference substitution requirements in Section 01 25 10)

2.2 PAINTS AND COATINGS

- A. Ready mixed, except field-catalyzed coatings.

- B. Prepare pigments:
 - 1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogenous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.

PART 3 - EXECUTION

3.1 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. Do not proceed unless substrate is suitable.
- 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 are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Interior Wood: 15 percent, measured in accordance with ASTM D-4442.
 - 3. Exterior Wood: 15 percent, measured in accordance with ASTM D-4442.

3.2 PREPARATION OF SURFACE

- A. General:
 - 1. Clean all exterior walls and surfaces of loose and scaly paint, dirt, dust, chalk, and other foreign matter by water-blasting using care not to damage substrate followed by hand scraping, sanding or wire brushing after surfaces are dry. Mildew must be treated with household bleach solution and rinsed thoroughly.
 - 2. Patch, caulk, set protruding nails and repair all surfaces and cracks where necessary with suitable patching materials and smooth off to match adjacent surfaces.
 - 3. Sand Glossy surfaces to dull surface and remove residue.
 - 4. Remove mildew from affected surfaces with a solution of Tri-Sodium Phosphate and bleach. Rinse with clean water and allow to dry completely.
 - 5. Existing surfaces to be recoated shall be thoroughly cleaned and de-glossed by sanding or other means prior to priming and painting. Patched and bare areas shall be spot primed with the same primer as specified for new work.

6. Rusty metal: Scrape, sand or wire wheel, feathering edges to sound coating. Dust surfaces. Topcoat.
 7. Remove soil and body oils completely from surfaces, including handrails, door edges and posts. Treat with Liquid Sandpaper or Dull-N-Bond.
 8. Remove hardware, accessories, plates, fixtures and similar items not to be finished. Reinstall at completion.
 9. Paint edges of sink cut-outs.
- B. Galvanized Surfaces: Remove all oils and contamination from galvanized surfaces scheduled to be painted by washing with a compliant solvent wash.
- C. Ferrous Metal: Remove grease, rust, scale, dirt and dust from ferrous metal surfaces. Primer coat shall be applied not less than 30 minutes, nor more than 3 hours after preparation of surface.
- D. Primed Metal: Sand and scrape shop primed metal to remove loose primer and rust. Touch-up bare, abraded and damaged areas with metal primer. Feather edges to make touch-up patches inconspicuous.
- E. Wood Surfaces:
1. Remove dust, grit and foreign matter from wood surfaces. Sand surfaces and dust clean. Spot prime knots, pitch streaks and sappy sections with a stain blocking primer where surfaces are to be painted. Fill nail holes, cracks and other defects after priming and spot prime repairs after patching material has fully cured.
 2. Wood surfaces with peeling areas are to have edges of broken paint film sanded to a feather edge.
 3. Back prime wood trim. Paint tops, bottoms, edges and cut-outs of doors.
- F. Plaster Surfaces:
1. Plaster surfaces shall be dry and free from efflorescence, encrustations and foreign matter. Fill cracks, holes and imperfections, smoothing repairs to match adjacent texture. Allow repairs to fully cure before priming.
 2. Prime plaster surfaces with specified primer. Caulk all cracks.
- G. Gypsum Board: Gypsum board shall be dusted clean and free from encrustations and other foreign matter.
- H. Preparation of other surfaces shall be performed following specific recommendations of the coating manufacturer.
- 3.3 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. Sand wood surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust particles just prior to applying next coat.
- G. Stipple all edges and corners to conceal brush marks.
- H. Doors: Paint entire door unless otherwise noted, including door top and bottom edge surfaces.
- I. Paint entire trim element. Painting of faces only is unacceptable. Trim surfaces must be wrapped with the trim color and not "faced off" or "Hollywooded".
- J. Tinting: Tint each primer a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint primer to match the color of the finish coat, but provide sufficient differences in shade of primer to distinguish each separate coat.

3.4 PROTECTION

- A. Protect work of other trades and items not intended to receive paint. Install "wet paint" signs to protect newly painted surfaces.

3.5 CLEANING

- A. Protection - Carefully protect areas where work is in progress from damage.
 - 1. Provide and spread clean drop cloths when and where required to provide the necessary protection.
 - 2. Immediately clean-up all accidental spatter, spillage, misplaced paint and restore the affected surface to its original condition.
- B. Clean-up:
 - 1. At completion of work, remove all materials, supplies, debris and rubbish and leave each area in a clean, acceptable condition.

2. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 SURFACES TO BE FINISHED

- A. Paint all new work and areas affected by new work, unless noted otherwise.
- B. 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.
- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
 1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
 2. Paint shop primed items occurring in finished areas.
 3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint.
 4. Paint dampers exposed behind louvers, grilles and convector and baseboard cabinets to match face panels.

3.7 PAINT SYSTEMS – EXTERIOR

- A. Paint New Plaster/Stucco, Cement Siding, Shingles, Common Brick and Concrete Walls, 3 coat:
 1. 1st Coat: ULTRA_GRIP Select, Interior/Exterior Multi-Surface Primer (UGSL00).
 2. 2nd Coat: EVERSIELD, Exterior Eggshell Paint (EVSH30)
 3. 3rd Coat: EVERSIELD, Exterior Eggshell Paint (EVSH30)
 - a. Special Notes and Instructions
 - 1) First primer coat full strength
 - 2) First top coat 50% color formula
 - 3) Second top coat full strength color formula
- B. Paint Metal Fascia Semi-Gloss, Acrylic, 3 coat:
 1. 1st Coat: ENDURAPRIME, Interior/Exterior Acrylic Rust Preventative Metal Primer, ENPR00, (5 mils wet, 2.0 mils dry). (If pre Primed: Show compatibility of primer and this coat can be deleted.)
 2. 2nd Coat: ARISTOSHIELD, Interior/Exterior Semi-Gloss Paint (ASHL50).
 3. 3rd Coat: ARISTOSHIELD, Interior/Exterior Semi-Gloss Paint (ASHL50).
- C. Paint Metal Doors and Casings:
 1. Spot Prime: BLOC-RUST Premium, Rust-Preventative Metal Primer

2. 1st Coat: ENDURAPRIME, Interior/Exterior Acrylic Rust Preventative Metal Primer (ENPR00)
3. 2nd Coat: ARISTOSHIELD, Interior/Exterior Semi-Gloss Paint (ASHL50).
4. 3rd Coat: ARISTOSHIELD, Interior/Exterior Semi-Gloss Paint (ASHL50).

D. Elastomeric Coating:

1. 1st Coat – D-E Super-Loc (SLPR00), Masonry Bonding Primer, (5.9 Mils wet, 2.0 mils dry)
2. 1st and 2nd Coats: Enduralastic10 (EDLX10), Elastomeric Wall Coating, (22-26 mils wet, 11-13 mils dry).

3.8 PAINT SYSTEMS -INTERIOR

3.9 COLORS

- A. To be selected by Architect from Manufacturers standard color palette and as scheduled on the "Finish Schedule" provided in the plans.

END OF SECTION 09 91 00

SECTION 10 28 00 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes Toilet accessories:
 - 1. Toilet seat cover dispensers
 - 2. Soap Dispensers
 - 3. Grab Bars at toilet stalls
 - 4. Paper towel Dispensers
 - 5. Toilet tissue dispensers
 - 6. Sanitary Napkin Receptacle
- B. Related Sections include the following:
 - 1. Division 9 Section "Gypsum Board" for mounting substrate
 - 2. Division 9 Section "Ceramic Tile" for mounting substrate

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
 - 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated on Drawings.
- C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Reference Standards: (Effective January 1, 2020) The 2022 Code of Regulations CCR, CFC, CMC, CPC, CEC Govern
 - 1. Title 19 CCR, Public Safety, State Fire Marshall Regulations
 - 2. Title 24 CCR, Part 1 - 2022 Building Standards Administrative Code
 - 3. Title 24 CCR, Part 2 - 2022 California Building Code, VOL. 1&2 (CBC) (2021 IBC, as Amended by CA)
 - 4. Title 24 CCR, Part 3 - 2022 California Electrical Code (CEC) (2020 NEC, as Amended by CA)
 - 5. Title 24 CCR, Part 4 - 2022 California Mechanical Code (CMC) (2021 IAPMO UMC, as Amended by CA)
 - 6. Title 24 CCR, Part 5 - 2022 California Plumbing Code (CPC) (2021 IAPMO UPC, as Amended by CA)
 - 7. Title 24 CCR, Part 6 - 2022 California Energy Code
 - 8. Title 24 CCR, Part 9 - 2022 California Fire Code (CFC) (2021 IFC, as Amended by CA)
 - 9. Title 24 CCR, Part 10 - 2022 California Existing Building Code
 - 10. Title 24 CCR, Part 11 - 2022 California Green Building Standards Code (Calgreen Code)

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace toilet and bath accessories that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 1 year.
- B. Installer's Warranty: 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Toilet and Bath Accessories: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified in a brushed stainless finish.
 - 1. Bobrick Washroom Equipment, Inc. (BASIS OF DESIGN)
 - 2. Or equal. Refer to Section 01 60 00 for substitution requirements

- B. Under lavatory Guards: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
 - 1. Handy-Shield by Plumberex Specialty Products, Inc. (Basis of Design)
 - 2. TCI Products.
 - 3. Truebro, Inc.
 - 4. Or equal. Refer to Section 01 60 00 for substitution requirements

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated. (brushed stainless steel finish)

- B. Steel Sheet: ASTM A 1008, Designation CS (cold rolled, commercial steel), 0.0359-inch minimum nominal thickness.

- C. Galvanized Steel Sheet: ASTM A 653, with G60 hot-dip zinc coating.

- D. Galvanized Steel Mounting Devices: ASTM A 153, 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. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

- G. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

- H. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.3 TOILET ACCESSORIES

- A. As indicated on Drawings.
 - 1. Surface mount toilet seat cover dispenser-Bobrick Model # B-221
 - 2. Surface mount soap dispenser – Symmetry Wall Dispenser
 - 3. Surface mount toilet tissue dispenser Tork #55TR Twin Roll, color: Smoke, Bobrick B-264 (for Pre-school Restroom)
 - 4. Grab bars:
 - a. Side: Bobrick Model # 5806 X 48
 - b. Rear: Bobrick Model # 5806 X 36
 - 6. Framed mirror – Bobrick Model # B-165 1830
 - 7. Recessed mount Sanitary Napkin Receptacle: Bobrick Model # B-353 or Model B-270

2.4 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 re-supplying.
 - 1. Provide minimum of six keys to Owner's representative.

PART 3 – EXECUTION

3.1 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.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 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 recommendations

END OF SECTION 10 28 00

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SECTION 13 21 26 – WALK-IN REFRIGERATION UNITS

PART 1 - TESTING AND APPROVALS

- A. U.L. Certified Panels
- B. Panels Certified to NSF/ANSI Standard #7.
- C. Electrical and refrigeration components are Underwriters Laboratories Listed or Recognized and
- D. National Sanitation Foundation Certified.
- E. SGS US Testing Company, Inc. Report Number 740813-1
- F. Flame spread and smoke developed per UL-723, ASTM E84-95b, ANSI/NFPA No. 255, & UBC No. 8-1.
- G. 2007 Federal Energy Independence & Safety Act (EISA) compliant
- H. Los Angeles Research Report Number 25314.
- I. City of Los Angeles Approved Fabricator Certificate
- J. California Energy Commission (CEC) Title 20 compliant.

PART 2 - CONSTRUCTION

2.1 Panel Construction

- A. Walk-in panels shall be modular in design and are to be constructed of 3½", 4", 5", and 6" thick pre-fabricated panels manufactured with 100% US made materials.
- B. Panels to be foamed-in-place UL approved polyurethane insulation between interior and exterior metal pans that have been die-formed and gauged for uniformity.
- C. Panel perimeter shall be tongue-and-groove design with 10 lb density urethane foam rail construction.
- D. Rails to have a ½" indent to assure flush finish surface with metal flange and attached with use of 2½" staples to stabilize the assembly.

- E. Single bulb NSF gaskets shall be attached on each panel.
- F. Panels shall be modular in design and connected with cam-locking fasteners to assure airtight seams and structural strength to the panels.
- G. Cam locks are lever acting with eccentric hooked locks and mating pins securely anchored in the adjacent panel to assure the ease of alignment and positive seal. Cam-lock spacing shall not exceed 48" on center.
- H. Corners and T Panels to have minimum $\frac{3}{8}$ radius per NSF Standard #7

2.2 FLOOR CONSTRUCTION

- A. Floor panels shall be 4 $\frac{3}{4}$ " thick and constructed with metal bonded to $\frac{3}{4}$ " exterior grade plywood and then foamed-in-place.
- B. Standard floor finish is .040" stucco-aluminum.
- C. Floors shall be designed and manufactured to support uniformly distributed stationary loads up to 650 pounds per square foot.
- D. If a floor is not required, alignment channel is provided. Channel is designed to be anchored to masonry floors and to provide a template for wall panels.

2.3 INSULATION

- A. CFC free polyurethane foamed-in-place insulation shall have 97% closed cell structure and insure proper insulation throughout the entire panel. Solid board foam insulation is not acceptable.
- B. Class 1 rated urethane foam to have thermal resistance (R-Value) of not less than R-8/inch, thermal conductivity (K-Factor) of not less than .120 BTU/hr per degree F/ inch and overall heat transfer coefficient (U-Factor) of not more than .030 BTU/hr per sq ft.
- C. Urethane foamed in place and cured to a solid state between metal skins at an average of 2.2 lbs per cubic foot.
- D. All foam panels to be supplied with Class 1 fire hazard insulation certified by Underwriters Laboratories as having a flame spread of 25 or less and smoke generation of 450 or less when tested in accordance with ASTM-E-84.

2.4 ENTRANCE DOORS

- A. Standard door shall be 36" X 78" flush mount construction and with PVC frame and jamb assembly and with magnetic gaskets.
- B. The door edge shall consist of a PVC perimeter into which the interior and exterior metal skins are secured and shall create a thermal break between metal facings.
- C. Magnetic gasket shall be dart and ridge design to allow quick replacement.
- D. Freezer doors shall have concealed heated jamb and threshold heater, easily accessible for re-placement or service.
- E. Heated pressure relief vent port shall be provided on freezer applications.
- F. Three (3) door hinges shall be heavy-duty cam-lift design in bright chrome finish.
- G. Hinges shall have steel pins with nylon bushings and shall be of sufficient size and number to support twice the weight of the door.
- H. The door latch shall be made of similar materials and finish as the door hinges. The latch shall incorporate an inside safety release that complies with OSHA standards.
- I. All doors shall be self-closing without assistance when opened up to 90 degrees and shall remain open when opened beyond 90 degrees.
- J. The bottom of the door shall have a double flexible sweep gasket

2.5 METAL FINISH

- A. Standard finish is 26 gauge embossed galvanized steel. U.S. produced steel with G-90 galvanized coating; galvanized coating thickness certification, material gauge certification & steel certificate of origin are required.
- B. Optional exterior and interior finishes include: stucco embossed galvalume; stucco embossed aluminum; stainless steel; smooth white aluminum; Smooth Galvanized; black galvanized steel; and Fiberglass reinforced plastic (FRP).

2.6 LIGHTING

- A. Light fixture 48" LED (shipped loose) shall be compact vapor-proof fluorescent type, shipped loose, with a shatterproof globe cover (light bulb included).

- B. Light switch with pilot light and digital thermometer shall be factory installed and flush-mounted on the exterior of the door frame.
- C. All wiring within the door frame, light switch, to be factory installed in concealed conduit (foamed-in-place) and shall terminate at the top of the frame. (All wires to be properly labeled). Field connection (by others) is required for complete operation; 120 volt, 60 cycle, 1-phase.
- D. All components U.L. certified

2.7 PANEL LOCKING ASSEMBLY

- A. Assembly of walk-ins shall be accomplished by cam-locking fasteners activated by a hex wrench provided by the factory.
- B. Cam & pin slots shall be mortise cut. Dado slots are not acceptable.
- C. Access ports shall be on the interior of panels to allow assembly of walk-ins from inside and shall be covered with snap on cap plugs.

2.8 PANEL GASKETS

- A. Flexible NSF vinyl gaskets shall be adhesive backed and installed on the exterior edge of the foam rail "tongue."
- B. Gaskets shall be impervious to stains, grease, oils, and mildew.

2.9 NSF

- A. All coolers and freezers shall be fabricated to comply with National Sanitation Foundation Standard (NSF) #7.
- B. The NSF label shall be affixed to the interior door jamb.
- C. UL labels shall be affixed to the panels.

2.10 TRIM BASE AND COVING

- A. Trim and Base Coving strips between walk-in walls and building walls shall be furnished by factory, shipped loose.
- B. Standard for cove base to match finish of box

PART 3 - REFRIGERATION

3.1 Refrigeration sized per ASHRAE standards.

3.2 Coolers:

- A. Equipped for 35°F operating temp, 10° TD;
- B. Condensing Unit with Time Clock on all Units 208/230v-1Ø or 3Ø, 460v 3Ø;
- C. Air defrost Evaporator Coil;
- D. R404A

3.3 Freezers:

- A. Equipped for -10°F operating temp, 10° TD;
- B. Condensing Unit with Time Clock on all Units 208/230v-1Ø or 3Ø, 460v 3Ø;
- C. Electric defrost evaporator coil;
- D. R404A

PART 4 - WARRANTY

- A. 10 year warranty on panels. Warranty is non-transferable.
- B. 1 year replacement warranty on parts.
- C. 1-Year manufacturers' warranty on compressor.
- D. Optional extended 4-year warranty available on compressor.
- E. Optional labor warranty available.

PART 5 - STRUCTURAL ENGINEERING CALCULATIONS

- A. Stamped Drawings, Certified in the State of California.
- B. \$2 Million Insurance Coverage – Professional Liability and General Liability.

END OF SECTION 01 10 00

SECTION 22 0000

PLUMBING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section and apply to this Section
2. Division 1 - General Requirements, General Mechanical Section 23 0013 apply to the Work of this Section.
3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. California Plumbing Code (CPC).
2. California Mechanical Code (CMC).
3. California Building Code (CBC).
4. California Green Building Standards Code(CGBSC).
5. California Electrical Code (CEC).
6. California Fire Code (CFC).
7. National Fire Code (NFC).
8. National Fire Protection Association (NFPA).
9. Local Building Department.
10. Local Fire Marshal.
11. Office of the State Fire Marshall.
12. Division of the State Architect.
13. California Energy Commission.
14. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

C. Scope of Work: (Plumbing Section Division 22)

1. Material and labor including rough-in for and connection to fixtures, appliances and equipment are:
 - a. WASTE AND VENT
 1. Soil piping
 2. Drain waste and vent piping (DWV)
 3. Indirect waste piping
 4. Traps.
 5. Vent flashings.
 6. Insulation of piping for condensation, heat, sound, and vibration.
 - b. WATER
 1. Potable water piping systems including, pressure reducing valves, relief valves, balancing valves, water hammer shock absorbers, air chambers.
 2. Isolation, Zone and Control Valves.
 3. Tempered water systems.
 4. Backflow preventers.
 5. Disinfecting of water systems.
 6. Insulation of piping and equipment for heat, sound, and vibration.
 - c. ALL PLUMBING FIXTURES AND SUPPORTS
 1. Including, but not limited to:
 - (a) Sinks, lavatories, water closets, urinals, etc., - all materials
 - (b) Supports (backing) for all plumbing fixtures and accessories
 - (c) Installation of sinks in or part of drainboards - all materials
 - d. CONNECTIONS
 1. Utilities-Sanitary sewer & water
 2. Temporary water, waste lines

3. The joining of pipe by any mode or method including, but not limited to, acetylene and arc welding, brazing, lead burning, plastics welding, soldering, wiped joints, caulked joints expanded or rolled joints, etc., used in connection with any of the work listed herein.
- e. LAYOUT AND CUTTING
 1. Holes, chases, channels, the setting and erection of bolts, inserts, stands, brackets, stanchions, supports, sleeves, escutcheon plates, thimbles, hangers, conduits, and boxes.
- f. EXCAVATION, TRENCHING AND BACKFILL
 1. In connection with plumbing and piping work shown herein
- g. TEMPORARY PIPING in connection with:
 1. Building and construction work
 2. Excavating and underground construction
 3. Demolition work
- h. PIPE HANGERS, SUPPORTS, ANCHORS, GUIDES, EXPANSION JOINTS
 1. Including:
 - (a) Supports for equipment to which pipe is connected, such as tank supports
 - (b) Acoustical pipe isolation
 - (c) Isolators-dielectric and vibration
 - (d) Anchors and thrust blocks of concrete, metal, etc.
 - (e) Seismic bracing
 - (1) Anvil/Badger, Mason Industries, B-Line/TOLCO or approved equal.
 - (2) Seismic hanger system design shall comply with current CBC requirements and ASE 7-05 and 7-10.
- i. SIGNS AND NOTICES
- j. ROOF FLASHINGS FOR PIPING PENETRATIONS
- k. TESTS

1. Piping, for tightness
2. Equipment for performance
3. Operating instructions
4. Final operation

1.2 ACCESSIBLE PLUMBING FIXTURES

- A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Sections 11B-213, 11B-305, & 11B-308, & 11B-Division 6.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.
- C. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.
- D. Comply with NSF 372, "Drinking Water System Components – Lead Content" for potable domestic water piping and components.

1.4 SUBMITTALS

- A. Comply with pertinent provisions of Architectural Division 1 Sections.
- B. Product Data: Within 35 calendar days after the Contractor has received the Notice to Proceed, submit 1 electronic PDF copy of the following to the Architect for approval prior to acquisition:
 1. Materials list of items proposed to be provided under this Section.
 2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.

3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.
4. Submittals for the entire project shall be submitted at the same time or may be rejected until all are included in one submittal package.
5. Submittals shall be provided electronically in PDF format, bookmarked by design tags for equipment and specification sections for materials. Incomplete or noncompliant submittals may be rejected.

1.5 DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

- A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.
- B. Acceptance of alternate products by Architect does not change this requirement.

1.6 PRODUCT HANDLING

- A. Comply with pertinent provisions of Architectural Sections.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 WASTE, VENT, SEWER AND STORM DRAINAGE

- A. Above and Below Grade
 1. All waste, vent, sewer and storm lines shall be of cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301, ASTM A-888 or ASTM A-74 for all pipe and fittings
 - a. Acceptable Manufacturers:
 1. AB&I Foundry
 2. Charlotte Pipe and Foundry
 3. Tyler Pipe Company
 - b. Couplings
 1. Standard Couplings: for hubless pipe and fittings shall conform to the manufacturer's installation instructions and

local code requirements. Hubless coupling gaskets shall conform to ASTM Standard C-564.

c. Mandatory Referenced Standards

1. Cast Iron Soil Pipe Institute Standard Specifications - Latest Issue

(a) CISPI 301: Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

(b) CISPI 310: Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

2. ASTM Standard Specifications - Latest Issue

(a) A-888: Standard Specifications for Hubless Cast Iron Soil Pipe and Fittings.

(b) C-564: Standard Specifications for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

B. Condensate (sized per CMC) and indirect waste drains

1. Type M Copper Water Tube ASTM B88 with wrought Copper solder fittings, ANSI-B16.22

2.2 DOMESTIC WATER PIPING

A. Above Grade (Distribution System)

1. Piping

a. For soldered, brazed and mechanical joints, 4" and smaller Copper Water Tube Type L Annealed Temper (Hard Drawn) ASTM B75 or ASTM B88.

2. Fittings

a. Wrought Copper Pressure Solder Fittings, ASME B16.22 or ASME B16-25, 95-5 Tin-Antimony Filler Metal.

b. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

c. Copper Unions: MSS SP-123, cast-copper alloy, hexagonal-stock body, with ball-and-socket, met-to-metal seating surfaces, and solder-joint or threaded ends.

- d. Press Fitting: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM. Press fittings shall have an inboard bead design.
 - 1. Copper Press Fittings: Viega/Rigid Tool Company, NIBCO, Elkhart/Apollo Xpress or approved equal.
 - 2. 2"NPS and smaller: Wrought copper fitting with EPDM-rubber O-ring seal in each end.
- e. Installation- Ready™ fittings for grooved end copper tubing shall be manufactured to copper-tube dimensions, ductile iron conforming to ASTM A-536, Grade 65-45-12, with Installation-Ready™ ends, PVDF (Poly Vinylidene Fluoride) and Grade "EHP" EPDM-HP [Grade 'T' Nitrile] gasket, and ASTM A449 electroplated steel bolts and nuts, rated to 300 psi (2065 kPa) with Type K or L Copper Tubing.

2.3 VALVES

- A. Acceptable Manufacturers: Victaulic Milwaukee, Hammond, Jomar, NIBCO, others as noted.

| Type | Size Range | Part Number |
|------|----------------------------------|--|
| Ball | 2" and smaller (2 or 3 piece) | Milwaukee UPBA400 Hammond UP8301A NIBCO 585-80-LF Victaulic Series P569 |

- B. All valves in copper piping shall be soldered in or have screwed threads. Copper-tube dimensioned grooved joints are acceptable for 2-1/2" and larger sizes. Threaded valves shall be installed with sweat to screwed adapters.
- C. Valves used on potable water services shall be UL classified in accordance with NSF-61 and meet the low-lead requirements of NSF-372.

2.4 HANGERS AND SUPPORTS

- A. In general, all pipe hangers and supports shall conform to the following except where special pipe hangers and supports are detailed on the Drawings. In all cases hanger and support details on the Drawings shall take precedent over the following:

Piping 6" Size and smaller:

| <u>Items</u> | <u>TOLCO Figure</u> | <u>Anvil</u> |
|--------------|---------------------|--------------|
| Pipe Hanger | 1; 2; 200 | 260 |

| | | |
|--|------------------|---------------------|
| Side Beam Clamp for Wood Joist | 58 | 207 |
| Beam Coupling for Steel Beams | 65 | 92 |
| Rod Coupling for Connection to "Hilti" | 70 | 135 |
| Inserts in Concrete Decks | 107;109A;109AF | N/A |
| Trapeze Hangers | Tolstruct A12 | AS200 |
| Pipe Clamp | TOLCO Cush Clamp | AS004OD- AS098OD |

B. Similar items by HOLDRITE, Anvil International, Erico-Caddy or TOLCO/B-Line will be acceptable.

C. Hanger Rods shall conform to the following table:

| <u>Tube/Pipe Size</u> | <u>Rod Diameter</u> |
|-----------------------|---------------------|
| 1/2" to 4" | 3/8" |
| 5" to 8" | 1/2" |
| 10" to 12" | 5/8" |

D. Trapeze hangers may be used where parallel runs of pipe occur. All rods on trapeze hangers shall be 1/2" minimum size.

E. Hanger Support Spacing shall be as follows unless shown otherwise on the Drawings:

1. Horizontal:

- a. Cast Iron: Every other joint unless over 4 feet, then at every joint.
- b. Copper: Every 6 feet for 1-1/2 inch and smaller, and 10 feet for 2 inch and larger.

2. Vertical:

- a. Cast Iron: Base and every floor not to exceed 15 feet.
- b. Copper: Every floor not to exceed 10 feet.

F. Refer to the plumbing code for materials not listed above.

G. At all points where insulated pipe contacts a hanger or support, the point of contact shall be protected by a metal insulation pipe shield #B3153 as manufactured by B-Line. Equivalent pipe protectors will be considered provided the substitute item meets the same standard of quality and performance as the specified item.

- H. Abrasion-Protection Isolators: Use for prevention of damage to tubes and piping caused by abrasion when passing through or in contact with studs, joists, and similar framing.
 - 1. Products:
 - a. HOLDRITE #200 Series Isolators and Clamps.
- I. Dissimilar Metal Isolators: Use for prevention of damage to tubes and pipes caused by contact between dissimilar metals.
 - 1. Products:
 - a. HOLDRITE #200 Series Isolators and Clamps.
- J. Acoustical Noise & Vibration Isolation System: Consisting of through-stud isolators, pipe clamps, riser clamp pads, neoprene and felt lining material and associated support brackets. For applications requiring acoustical isolation of tubing, piping, and equipment from structure.
 - 1. Products:
 - a. HOLDRITE Silencer System with HOLDRITE STOUT Bracket System.
- K. Seismic Restraint Devices
 - 1. Available Manufacturers:
 - a. Anvil/Badgr
 - b. Mason Industries
 - c. B-Line Tolco Division of Eaton
 - 2. Seismic hanger system design shall meet the requirements of IBC, CBC and ASCE 7-05 and 7-10.

2.5 WALL AND FLOOR PENETRATIONS

- A. Fire walls and floors:
 - 1. Wall and floor penetrations shall be protected with a U.L. approved fire rated system. The system shall be per the Drawing Details, or other manufacturer's installation instructions.
 - 2. Fire stopping materials by Hilti, Metacaulk, or 3M are considered equal. The material shall be the same as called out for in the U.L. approved system.
- B. Poured concrete walls and floors.

1. Pipes penetrating poured concrete walls and floors shall be protected by providing the following:
 - a. A Schedule 40 PVC sleeve one (1) size larger than the pipe or one quarter (1/4) inch of foam material wrapped around and secured to the pipe or packed and caulked with mineral wool.
 - b. Protection shall end flush with the wall or floor surface.

C. All walls and floors:

1. Piping passing through walls and floors exposed to view shall be provided with chrome plated split-ring escutcheon plates in finished areas. Brass or galvanized escutcheon plates may be used elsewhere.

2.6 FLASHING

- A. All flashing shall be 4 lb. sheet lead and all vents penetrating the roof shall be flashed and counter-flashed. Stoneman Co. roof flashing assembly with 10" skirt or equal may be used.
- B. The flashing for vents penetrating a metal roof shall have a corrosion resistant aluminum base compatible with the roofing system. A rubber type flashing by "Tech Specialties" shall be installed between the flashing and pipe.
- C. For single ply roofing, provide flashing per roofing manufacturer recommendations or installation instructions.

2.7 CLEANOUTS

- A. Provide cleanouts per Drawings and details on Drawings. Cleanouts as manufactured by J.R. Smith, Mifab, Sioux Chief, or Zurn are acceptable substitutes provided they are equal if approved by Engineer.
- B. Cleanout tops to be installed with tamper-proof screws.

2.8 FLOOR SINKS

- A. Provide floor sinks as specified on the Plumbing Fixture Schedule. Enameled cast iron floor sinks as manufactured by J.R. Smith, Mifab, Sioux Chief, Zurn, or Commercial Enameling are acceptable substitutes provided they are equal if approved by Engineer.

2.9 WATER HAMMER ARRESTORS

- A. Provide Wilkins Piston Model #1250XL, Sioux Chief #65X-X, Precision Plumbing Products, or equal, as sized on the Drawings or required by PDI. Install per manufacturer's instructions.

2.10 AUTOMATIC TRAP PRIMERS

- A. Provide Precision Plumbing Products, J.R. Smith, Mifab, Sioux Chief, or Zurn as specified on the Drawings. Install per manufacturer's instructions.

2.11 PLUMBING FIXTURES

- A. Fixture locations, quantities, types, sizes and connections shall be as shown on both the Plumbing and Architectural Drawings. If a conflict in fixture location is noted between the Plumbing and Architectural Drawings, the Architectural Drawings shall take precedence.
- B. Fixtures shall be thoroughly protected against damage to the chrome plate or enamel, by chipping, scratching or other damage during the entire period of construction. Roof drains, floor sinks and drains, toilet and sink drains, plumbing vents, and all other similar fixtures shall be covered to prevent trash from entering the pipes until final installation of grates, domes, fixtures or other protective devices.
- C. Provide fixtures as specified in the Plumbing Fixture Schedule.
- D. Vitreous China fixtures: American Standard, Kohler, Mansfield, Sloan, Toto, or Zurn are acceptable substitutes provided they are equal if approved by Engineer.
- E. Fixture carrier numbers listed are as specified on the Plumbing Schedule; however, carriers as manufactured by J.R. Smith, Mifab, or Zurn are acceptable provided they are equal.

2.12 CONNECTORS

- A. Provide Brass Craft "Speedway" or equal heavy pattern iron pipe size brass stops, rigid or flexible supplies and chrome plated brass "P" traps. Stops in "Public" areas to have screwdriver slots and those in "Private" areas to have all cross handles.
- B. Provide Brass Craft or equal flexible stainless steel braided water supplies to appliances. They may also be used to fixtures as an option to rigid supplies. Aquaflo is an acceptable substitute.

2.13 ACCESS BOXES

- A. See section 23 0013 for access panels.

2.14 BACKFLOW PREVENTORS

- A. Provide all potable water outlets with hose attachments with non-removable hose bibb backflow preventers per the C.P.C.

2.15 PROTECTIVE INSULATION (ADA FIXTURES)

- A. Provide approved manufactured, molded antimicrobial vinyl protective pipe and fitting covering for exposed waste and drain assembly and for hot and cold water supplies and stops. Protective system shall consist of pre-formed pipe or tubing sleeve and pre-formed fitting patterns for trap and stops. Assembly shall have integral snap fasteners.
- B. Provide protective covering for off-set drain assembly and disposer at kitchen sinks.
- C. Foam pipe wrap, duct tape, baggy-type covers, tie-strap fasteners are not acceptable.
- D. Acceptable manufacturers:
 - 1. Oatey/Dearborn Brass "ADA"
 - 2. Truebro "Lav-Guard"
 - 3. Plumberex "Pro-Xtreme"
 - 4. Zurn #Z89XX-XX

2.16 INSULATION

- A. All pipe insulation shall conform to Section 123 of the California Energy Efficiency Standards except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent. Outside insulation shall be protected with a hard plastic or metal shell covering.
- B. Insulation and lining material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 255 or U.L. 723 and shall conform to NFPA 90A and 90B.
- C. Interior primary condensate piping shall be insulated with Armacell AP/Armaflex tube insulation with reinforced lap seal or approved equal.
- D. Domestic cold water piping shall be insulated with a minimum 1" insulation in unheated areas of the building and where exposed outside of the building.
- E. Domestic hot water piping shall be insulated with Owens-Corning Fiberglass heavy density pipe insulation 25 ASJ/SSL-II (All Service Jacket/Double/ Self-Sealing Lap). Insulation shall be UL rated non-combustible pipe insulation with a k factor of 0.24-0.28 @ 100 degrees F. mean temperature, an embossed vapor barrier laminated and pressure sealing lap adhesive. All lap and butt strips shall

have integral pressure-sensitive strips and shall be applied in strict accordance with manufacturer's instructions.

- F. Insulation thickness' shown below are based on insulation having a conductivity range of 0.22 to 0.28 per BTU/inch per hour per square foot per °F temperature of 100 degrees F.

- 1. Temperature Range: Above 105°F-140°F

| Pipe Size | Minimum Insulation Wall Thickness |
|-------------|-----------------------------------|
| 1" and less | 1.0" |
| 1.25" | 1.5" |
| 1.5" | 1.5" |
| 2" or more | 2.0" |

- G. Insulation materials not meeting the specified conductivity range shall be submitted for approval and determination of the insulation thickness required.

PART 3 - EXECUTION

3.1 GENERAL CONDITIONS

- A. Examine the areas and conditions under which Work of this Section will be performed. Conditions detrimental to timely and proper completion of the Work shall be brought to the attention of the Architect before the installation of materials. Do not proceed until unsatisfactory conditions are corrected. Incorrectly installed materials requiring changes will be at Contractor's expense.
- B. All plumbing fixtures, appliances, and appurtenances furnished with manufacturer's installation instructions shall be installed per those instructions.

3.2 PLUMBING SYSTEM LAYOUT

- A. Lay out the plumbing system in careful coordination with the Drawings. Determine proper elevations for all components of the system and use only the minimum number of bends to produce a satisfactorily functioning system.
- B. Follow the general layout shown on the Drawings in all cases except where other Work may interfere.
- C. Lay out pipes to fall within partitions, walls, or roof cavities, and to not require furring other than as shown on the Drawings.

3.3 PIPING INSTALLATION

- A. Pipe sizes as shown on drawings are Nominal Pipe Size (NPS) or Iron Pipe Size (IPS). Drawings and fixture schedule indicate pipe sizing per the CPC and

Standard Engineering Practice. Pipe sizes shall be maintained to fixtures, appliances and equipment. Approved reducing fittings shall be installed at all points of connections.

- B. Install piping generally square with building, free of traps or air pockets, and true to line and grade. Keep all piping tight to the building structure, unless pipe slope is required. Do not install piping in any locations where, in the Architect's opinion, it will interfere with the use of the building or create a safety hazard. Where space is inadequate, notify the Architect in time to avoid unnecessary Work. Install all exposed piping as high as possible without interfering with other trades.
- C. Make changes in direction with manufactured fittings; use long radius elbows. Street elbows, bushings, close nipples and bending of pipe or tubing will not be allowed.
- D. Provide "P" traps at sanitary sewer drainage devices without integral traps.
- E. Use friction wrenches when installing brass, polished, or soft metal piping, and when installing piping exposed in finished areas. Replace piping showing wrench marks.
- F. Attach escutcheon plates to pipes with set screws or spring clamps with concealed hinges. Continue insulation through escutcheon plates.
- G. General:
 - 1. Proceed as rapidly as the building construction will permit.
 - 2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
 - 3. Cut pipe accurately, and work into place without springing or forcing, properly clearing windows, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.
 - 4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
 - 5. Provide sufficient swing joints, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
 - 6. Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment. Support the equipment independently from the pipe.

7. Pipe the drains from mechanical equipment, drip pans, relief valves, air vents and similar locations, to an open sight drain, floor drain, or other acceptable discharge point, and terminate with an air break or air gap per C.P.C.
8. Securely bolt all equipment, isolators, hangers, and similar items in place.

3.4 HANGER AND PIPE SUPPORT INSTALLATION

- A. Support pipes from structure with assemblies specified. Provide auxiliary members, anchors, guides, and sway braces necessary to maintain pipe alignment and prevent excessive movement or strain on piping system or components; allow for expansion and contraction of piping. Provide at least one hanger for each branch. Do not use powder driven fasteners, wire, perforated tape, nails, wood blocking, or other makeshift devices to support pipe.
- B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- C. Isolate piping systems from building structure to minimize noise transfer by using acoustical suspension isolator silencer and bracket system.
- D. Protect tubing and piping from damage caused by abrasion when passing through studs, joists, and similar framing using abrasion protection isolators.
- E. Penetration Protection: Provide allowance for thermal expansion and contraction of copper tubing passing through a wall, floor, ceiling or partition by wrapping with an approved tape or pipe insulation, or by installing through an appropriately sized sleeve. Penetrations of fire resistance rated assemblies shall maintain the rating of the assembly.
- F. In plenum-rated applications, use tested clamp and isolator support systems designed specifically for this application.
- G. Prevent damage to piping and tubing caused by contact between dissimilar metals using insert system designed specifically for this application.
- H. Attach supports to structure with bolts, screws or concrete anchors, per support manufacturer's requirements.
- I. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.5 JOINTS AND CONNECTIONS

- A. Cut pipe shall be reamed to full inside diameter of pipe. Cut threads straight and true. Ensure all filings have been removed from inside of the pipe. Apply liquid Teflon to male pipe threads and not inside fittings. Use graphite on cleanout plug threads.
- B. Couplings in cast iron "No-Hub" soil/waste pipe and fittings shall be made up with neoprene gaskets and stainless steel bands conforming to CISPI 310, torque to the manufacturer's specification with an approved torque wrench. Joints in hub and spigot shall be made up with compression gaskets conforming to ASTM C-564.
- C. Joints in copper tube shall be made with 95-5 tin-antimony or lead-free solder, applied in strict accordance with the manufacturer's directions.
- D. Dissimilar metals shall be isolated with dielectric couplings, "EPCO" or approved equal. Dielectric Waterway Fittings shall be UL classified in accordance with ANSI / NSF-61 for potable water service, Victaulic Style 647. Provide access panels at all hidden couplings.
- E. All plastic pipe shall be joined in accordance with the manufacturer's recommendations for their pipe and IAPMO Installation Standard per the latest edition of the C.P.C.
- F. Press Connections: Copper press fittings shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.
- G. Pipe Protection: Provide protection against abrasion where copper tubing is in contact with other building members by wrapping with an approved tape, pipe insulation or otherwise suitable method of isolation.
- H. Penetration Protection: Provide allowance for thermal expansion and contraction of copper tubing passing through a wall, floor, ceiling or partition by wrapping with an approved tape or pipe insulation, or by installing through an appropriately sized sleeve. Penetrations of fire resistance rated assemblies shall maintain the rating of the assembly.

3.6 SANITARY SEWER, VENT AND INDIRECT WASTE SYSTEM INSTALLATION

- A. Install horizontal drainage piping at a minimum 2%, condensate 1%, slope unless otherwise noted. Where this is impractical notify the Architect before installing the pipes.
- B. Install vent piping to drain back into the sewer system.
- C. Provide cleanouts where shown on Drawings and where required by governmental agencies having jurisdiction.

3.7 VALVE INSTALLATION

- A. Provide valves in the water, air, and gas systems. Locate and arrange to provide complete regulation of apparatus, equipment, and fixtures.
- B. Provide valves in at least the following locations:
 - 1. In branches and/or headers of water piping serving a group of fixtures.
 - 2. On both sides of apparatus and equipment.
 - 3. For shutoff of risers and branch mains.
 - 4. For flushing and sterilizing the system.
 - 5. Where shown on the Drawings.
- C. Locate valves for easy accessibility and maintenance. Provide access panels for all hidden valves.
- D. Unions shall be installed downstream of all screwed valves.

3.8 WATER HAMMER ARRESTOR INSTALLATION

- A. Provide water hammer arrestor on hot and cold water lines.
 - 1. Install at all quick closing valves, solenoids, and supply headers at plumbing fixture groups.
 - 2. Locate and size as shown on Drawings, and where not shown, locate in accordance with Plumbing and Drainage Institute Standard WH-201.
 - 3. Install water hammer arrestor behind access panels.

3.9 BACKFLOW PREVENTION INSTALLATION

- A. Protect plumbing fixtures, faucets, hose connections, and other equipment having plumbing connection, against possible back-siphonage.
- B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

3.10 PLUMBING FIXTURE INSTALLATION

- A. Connect plumbing services to fixtures as shown on Drawings and as specified.
- B. Install compression stops and flexible supplies per fixture manufacturer's recommendation or as high as possible on wall directly below fixtures.
- C. Install fixtures at right angles to, and tightly against, building surfaces, and in proper alignment. Fill gaps between fixtures and building surfaces with white grout. Mounting heights and locations shall be as shown on the Drawings, or, if not shown, as directed by the Architect.

3.11 INSULATION INSTALLATION

- A. Clean and dry surfaces prior to application of insulation or adhesives.
- B. Insulate piping, fittings, valves, and strainers. Leave unions exposed. Where insulation terminates, bevel ends of insulation and continue jacket over insulation and secure to pipe. Do not interrupt insulation at hangers, supports, clamps, or penetrations through structure. Fittings shall be finished with "Zeston" or approved equal fitting closures. If fitting closures not available, use 8 oz. canvas dipped in "Seal-Fas".
- C. Attach longitudinal jacket laps and butt strips with factory applied pressure sensitive adhesive. On concealed piping only, outward clinching coated staples at two inch spacing may be used. Cover elbows with one piece polyvinyl chloride covers. Secure with tack fasteners. Tape ends of covers with matching tape on exposed piping. Seal off all cut ends with canvas and Benjamin Foster 30-36.
- D. Insulate traps and trap arms on floor sinks located above slab receiving discharge from ice machines and soda dispensers with 1/2" insulation.
- E. Insulate primary condensate piping located within return air plenums with 1/2" wall thickness.

3.12 TESTING AND ADJUSTING

- A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction. See Section 23 0013 for test requirements.
- B. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

3.13 CLEANING (For potable water systems.)

- A. Disinfection: The copper hot and cold water distribution system shall be disinfected prior to being placed in service. The system shall be disinfected in accordance with AWWA C651 or the following requirements:
1. The piping system shall be flushed with potable water until discolored water does not appear at any of the outlets.
 2. The system shall be filled with a water chlorine solution containing at least 50 parts per million of chlorine. The system shall be valved off and allowed to stand for 24 hours. Or, the system shall be filled with a water chlorine solution containing at least 200 parts per million of chlorine. The system shall be valved off and allowed to stand for 3 hours.
 3. Following the standing time, the system shall be flushed with water until the chlorine is purged from the system.
 4. Provide bacteriological sampling and analysis results to the Engineer for review.

3.14 WARRANTY

- A. The contractor shall warranty all systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

END OF SECTION 22 0000

SECTION 23 0000
HEATING, VENTILATION , AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Related Documents:

1. The other Contract Documents complement the requirements of this Section and apply to this Section
2. Division 1 - General Requirements, General Mechanical Section 23 0013 apply to the Work of this Section.
3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.

B. Codes and Regulations:

1. California Plumbing Code (CPC).
2. California Mechanical Code (CMC).
3. California Building Code (CBC).
4. California Green Building Standards Code(CGBSC).
5. California Electrical Code (CEC).
6. California Fire Code (CFC).
7. National Fire Code (NFC).
8. National Fire Protection Association (NFPA).
9. Local Building Department.
10. Local Fire Marshal.
11. Office of the State Fire Marshall.
12. Division of the State Architect.
13. California Energy Commission.
14. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.

C. Included: Work includes, but is not necessarily limited to, the following.

1. The Work covered by this Specification shall include furnishing labor, material, equipment and services to construct, install and place in operation, the complete Heating, Ventilating and Air Conditioning Systems to the extent as indicated, and as shown on the Drawings and specified herein. The Work covered under this Section shall hereinafter be referred to as the Mechanical System.
2. A system of temperature controls shall be furnished and installed complete as hereinafter described. Low voltage wiring and conduit, complete with electrical accessories and materials as required for the installation of the temperature control system shall be furnished and installed under this Section of the Contract, but shall conform to the Specification requirements as set forth under Division 26.
3. Centrifugal Exhaust Fans
4. exhaust duct systems complete with grilles.
5. Vibration Isolators

D. Work Not Included In This Section:

1. Blocking, framing and wood supports required for the purpose of accommodating the Mechanical System unless specifically called for under this Division. The contractor is responsible for the correct location of such items and shall bear the expenses covering their omission or improper location.
2. Electrical connections to motors, electric starters, disconnect and over-current protective devices, unless specifically called for by this Section, or unless the equipment is furnished as an integral part of the Mechanical System Equipment, as hereinafter specified or noted on the Drawings.
3. Line voltage electrical wiring and conduit, except where specifically called for on the Drawings or hereinafter in this Section.
4. Painting, except when supplied as factory finish, or specifically called for in this Section or on Drawings.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

- B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

1.3 SUBMITTALS

- A. If the heating and/or air conditioning units are substituted with a different brand than that specified on the Drawings, the Title 24 Energy Compliance Calculation may have to be re-run. This re-calculation is NOT to be considered a general CA Task and will be billed hourly (6 hr minimum) as an Additional Service at the current rate defined in Exhibit B for Senior Energy Analyst.
- B. Comply with pertinent provisions of Architectural Section.
- C. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit 6 copies of the following to the Architect for approval prior to acquisition:
 - 1. Materials list of items proposed to be provided under this Section including, but not limited to heating, ventilating and air conditioning equipment and mountings, air distribution equipment, ductwork and fittings, flexible ductwork, flue vent pipe, duct specialties, flexible connections, insulation, lining and adhesive, duct joint sealer, temperature controls, piping and accessories.
 - 2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.
 - 3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.
 - 4. Submittals for entire Project shall be submitted at the same time or may be rejected until all are included in one submittal package.
 - 5. Submittals shall be provided electronically in PDF format, bookmarked by design tags for equipment and specification sections for materials. Alternativley, hard copies will be accepted if 6 copies are provided, bookmarked as previously noted and bound together separately in three-hole folders or three ring binders.

1.4 DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS

- A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.
- B. Acceptance of alternate products by Architect does not change this requirement.

1.5 PRODUCT HANDLING

- A. Comply with pertinent provisions of Architectural Sections.

PART 2 - PRODUCTS

2.1 HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

- A. Ventilating, and Air Conditioning Equipment: Equipment shall be as specified on the Drawings. All other equipment shall be pre-approved by the Mechanical Engineer.
- B. It shall be the responsibility of the Contractor to see that any substituted equipment performs similarly to that which is specified and fits in the same area as specified. Cost of any additional Work caused by the substitution of equipment shall be borne by the Contractor.

2.2 AIR DISTRIBUTION EQUIPMENT

- A. Grilles, registers and ceiling diffusers and other accessory equipment shown on the Drawings and "Grille, Register and Diffuser Schedule" shall be manufactured by Titus unless shown otherwise.
- B. Any substitutions of the above equipment which may be proposed by the Contractor shall be re-sized to suit his equipment by the proposed manufacturer and submitted in tabular form listing components proposed for each location in the System, identifying each as to location, design, air quantity passing through the devices, pressure drop, noise criteria data, velocities of air leaving the device and "K" flow factors for each item. Manufacturer's data sheets showing dimensions and recommended method of installation for each component must also be included.

2.3 ROUND DUCTWORK AND FITTINGS

- A. 2-10" w.g. round duct through 61" in diameter shall be United Sheet Metal spiral lockseam unseal duct, or approved equal, manufactured from galvanized steel meeting the ASTM A-527-71 in the following gages:

| Diameter | Metal Thickness |
|----------|-----------------|
| 3-13" | 26 ga. |

- B. Round duct shall be new and exclusively obtained for this project. Each piece shall be in 20' lengths. Ducts shall be cut to length required with joints only at fitting locations, except on duct runs longer than 20 feet.
- C. Fittings shall be United Sheet Metal galvanized fittings in the following gauges:

| | |
|----------|-----------------|
| Diameter | Metal Thickness |
| 3-13" | 24 ga. |
- D. Spiral duct fittings must be manufactured as separated fittings and shall not be saddle taps, stubs or tap-in fittings tapped into spiral duct, nor may they be dove-tailed tap-ins into pipe or fittings.
- E. Reducers shall occur after a branch tap occurs on the main portion of the fitting. Divided-flow fittings shall be used unless shown otherwise on the Drawings.
- F. Joints on ducts and fittings shall be covered and sealed with 4" wide, 6 oz. canvas saturated with Arabol lagging adhesive, or Hardcast DT tape in conjunction with Hardcast FTA-20, nonflammable, non-toxic adhesive, or GlenKote duct sealer or other approved mastic type sealer. Duct tape will not be allowed. Where exposed to weather, paint lagging strips with two coats of silver enamel paint.
- G. All ductwork shall be constructed in accordance with appropriate tables of the latest ASHRAE "Guide and Data Book" and SMACNA "HVAC Duct Construction Standards" handbook and Chapter 6 of the 2019 CMC. Duct gauges to be in accordance with parts A and D of this section.

2.4 FLEXIBLE CONNECTIONS

- A. Provide fireproof, insulated, non-porous, flexible connections between fans and ducts or casings and where ducts are of dissimilar metals. For round ducts, securely fasten flexible connections by zinc coated steel clinch-type drawbands. Flexible connections shall be DuroDyne "Insulfab" or "Insulflex" or approved equal.
- B. Provide a duct support next to each flex connector to prevent any strain on connection.

2.5 ELECTRICAL EQUIPMENT

- A. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for motor control specified. Mount starter adjacent to equipment. See electrical drawing. Maintain minimum of 3' clearance to front of device.
- B. Motor Starters: Shall be NEMA I or III as appropriate, general purpose, weather-resistant, with watertight enclosure where required.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the Work of those trades for interface with the Work of this Section.

3.3 PREPARATION

- B. Flashing:
 - 1. Where items of this Section penetrate the roof, outer walls, or waterproofing of any kind, provide under this Section base flashing and counterflashing required at such penetration.
 - 2. Provide on each pipe passing through the roof a 4 pound seamless lead flashing and counterflashing assembly.

3.4 GENERAL INSTALLATION REQUIREMENTS

- A. Conceal piping, ductwork, and equipment in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect in time to avoid unnecessary Work. Do not cut or notch structural members without specific approval of the Architect.
- B. Follow manufacturer's instructions on items not specifically covered in drawings and specifications. Report discrepancies to Architect for clarification before starting Work.

3.5 EQUIPMENT INTERFACE

- A. For electrically operated equipment, verify the electrical characteristics actually available for the Work of this Section and provide equipment meeting those characteristics.

3.6 INSTALLATION OF DUCTWORK

- A. Ductwork shall be delivered to the Project site with surfaces clean and free of loose dirt and rust. Special care shall be exercised by the Contractor to store the duct in a clean area to prevent the accumulation of dirt prior to installation. Fabricated or partially fabricated duct sections shall not be stored in open fields or on dirt areas surrounding the construction site. Paved areas may be used, if

available, provided adequate protection is provided to prevent the accumulation of dirt on duct surfaces. If possible, the Contractor should arrange to deliver duct to the project site and store on the floor of the area in which it is to be installed.

- B. Before installation of ductwork, the Contractor shall inspect each section of duct and wipe internal surfaces clean. At the end of each Work period, or when ends of duct are left installed for future extension, the open ends shall be tightly closed off with a plastic sheet and taped securely to the open end of the duct.
- C. Construct and install sheet metal in accordance with latest SMACNA recommendations. Provide variations in duct size and additional duct fittings as required and approved by the Architect at no extra cost to the owner.
- D. The throat radius of bends shall be 1-1/2 times the width of the duct. Provide turning vanes in any mitered turn greater than 45 degrees.
- E. Transition slopes shall be no less than one to five where space permits.
- F. Abrupt offsets in the duct system greater than 30 degrees will not be allowed.

3.7 CONTROL DEVICE IDENTIFICATION LABELS

- A. Exhaust fan switches shall have labels mounted on or just above the control device labeled with the equipment being controlled. As an example, for a exhaust fan controlled by a switch the label would read "EXHAUST FAN # 1"
 - 1. Labels shall be 2" x 1" x 1/8" thick Formica/plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners.
 - 2. Labels shall be white with 3/8" high red engraved letters.
 - 3. Labels shall be attached to equipment with adhesive.

3.8 WARRANTY

- A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

3.9 SHOP DRAWINGS

- A. The Contractor shall prepare shop drawings covering mechanical duct systems, equipment, and piping systems. The drawings shall be prepared electronically at 1/4" / ft scale minimum (or greater as needed for clarity or as requested by the Architect or Mechanical Engineer) and shall include sections, elevations, and dimensions in relation to the building structure and other trades as required to demonstrate coordination with all other disciplines and trades on the project.

- B. Shop drawings are to be submitted to the Architect for approval per the Submittals requirements of this section prior to any fabrication.

3.10 MECHANICAL SYSTEM START-UP RESPONSIBILITY

- A. Start-up Mechanical Systems, and perform any such Work as may be required to adjust the systems to meet the requirements of the Contract Documents.
- B. Install new clean specified filters in equipment containing filters immediately prior to owner occupancy. Contractor to bear all costs for this work.

3.11 MECHANICAL SYSTEM BALANCING

- A. Testing and air balancing shall be performed by an independent balancing company certified by Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB) or other ASHRAE recognized TAB specific certification. Testing and balancing shall be performed by a company other than the mechanical system installers/contractor. Service provider credentials to be included with project submittals for approval by the Mechanical Engineer.
- B. After Systems have been tested as outlined, air flow rates shall be balanced, and control devices adjusted. Balance and testing shall not begin until systems have been completed and are in full working order. Upon completion of the balancing operation and prior to final acceptance of the systems, the balancing firm shall submit a report, per the Submittals requirements of this section, certifying to the proper performance of the system for approval by the Mechanical Engineer.

1. The following information shall be included in the Air Side Report:

- a. Fan speeds.
- b. Motor current readings and voltage readings.
- c. Air quantities in CFM at supply, return, exhaust terminals, and outside air intakes, both at design value and actual measured value. Test and adjust each terminal to within +10% of design requirements.
- d. Air velocities in FPM at supply, return, and exhaust terminals at design value and actual measured value.
- e. Positive static pressure, negative and total pressures and total air quantities for each fan system.
- f. Equipment nameplate data.

END OF SECTION 23 0000

SECTION 23 00 13
GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Related Documents:
 - 1. The other Contract Documents complement the requirements of this Section.
 - 2. Division 1 - General Requirements applies to the Work of this Section.
 - 3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.
- B. Codes and Regulations:
 - 1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.
- C. Included: Work includes, but is not limited to the following:
 - 1. Ventilating and System Balancing
 - 2. Plumbing
 - 3. Carpentry and metal Work required for Work of this Section and not specifically shown under another Section. Openings in concrete or masonry construction shall be either core drilled or saw cut unless indicated otherwise on Drawings.
 - 4. Coordination Drawings
 - 5. Demolition:
 - a. The Demolition Plans were prepared for the convenience of the Contractor. The Engineer does not represent that all items, which may require demolition, have been shown. It shall be the responsibility of the Contractor to carefully examine the site and the Contract Documents and to perform all demolition and reconstruction, which may be required for the proper execution, and completion of work.
- D. Related Work:
 - 1. Cutting and Patching (Division 30)

1.2 DEFINITIONS

- A. Furnish: Purchase and deliver to job site in new condition.

- B. Install: Receive and store at job site until required; place secure and connect; furnish required appurtenances.
- C. Provide: Furnish and install as defined above.
- D. Section: Refers to a Section of these Specifications.
- E. Standards: The issue in effect as of the date of the contract documents.

1.3 PROJECT RECORD DRAWINGS

- A. Comply with pertinent provisions of Architectural Sections (Division 01).

1.4 SERVICE INTERRUPTIONS

- A. When Work of this Section requires temporary shutdown of existing systems for connections, the shutdown shall be made only during pre-arranged time agreeable to the Owner.

1.5 CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

- A. The Mechanical Drawings are, in general, made to scale and the Contractor may obtain approximate distances and dimensions by scaling the Plans. It is distinctly understood, however, that it is done entirely at the Contractor's responsibility. Refer to Architect's Plans and Specifications for construction details, which will affect the Work and equipment. Examine the Architectural, Civil, Structural, Mechanical, Electrical, Landscape, Irrigation, Data, Fire Protection and Plumbing Plans and Specifications to ensure that this work does not conflict with the above trades. Plumbing, Mechanical and Electrical Plans are diagrammatic and, therefore, do not necessarily represent the exact installation. However, pipe sizing for utility services and ductwork are calculated per their respective codes and Standard Engineering Practice and shall be installed as sized from point of origin to terminal point. It shall remain the Contractor's responsibility to submit Shop Drawings if he/she has any questions about the final arrangement. Nothing on these Plans or Specifications shall be construed to permit work not conforming to all applicable codes and regulations.

PART 2 - PRODUCTS

2.1 ACCESS PANELS

- A. If not called for under other Sections, furnish Milcor, Elmdor, or Jay R. Smith access panels where shown on the Drawings or required for maintenance access to completed Work of this Section. Submit size, type, and location of proposed access panels not specifically shown, for review by Architect.

- B. Access panels shall be constructed of 16 gauge prime coated steel or stainless steel with screwdriver operated cam latch, concealed hinges, and fire rating equal to adjacent construction.
- C. Provide flush type doors with:
 - 1. Stainless steel finish for tiled surfaces.
 - 2. Prime coated finish for other surfaces.

2.2 FLASHING

- A. Provide watertight flashing at all openings through exterior walls and roof. Refer to Architectural Drawings.

2.3 BELT DRIVES

- A. All belts shall be "Vee" type, or approved equal. Sheaves shall be adjustable and shall be sized to drive fan at scheduled RPM when set at midpoint of adjustment range. All belt drive assemblies shall be rated at 150% of drive motor horsepower. OSHA approved belt guards shall be provided over all drive assemblies. The Contractor shall change any belts and drives as required to produce the specified CFM.

2.4 VIBRATION ISOLATION AND NOISE CONTROL

- A. All fans, heating and ventilating units, air conditioning units, blowers and similar equipment shall be securely mounted to and/or supported from the structure.
- B. Isolate all bare water piping from structural members or hangers with "Trisolators" or submitted and approved equal insulating sleeves. Install hangers on outside of insulated jacket on all insulated lines.

2.5 WEATHERPROOFING

- A. All equipment exposed to weather shall be protected by means of a suitable finish (i.e. paint). All fan cabinets, roof-mounted equipment, and ductwork shall be fabricated in such a manner to prevent leakage through seams and joints. Water rated, exterior hoods shall be provided over motors, belts, and other devices to insure against damage by water. At all locations where pipes and/or ducts penetrate exterior walls, or roofs, suitable rain tight flashing shall be provided.

2.6 ELECTRIC MOTORS AND ELECTRICAL DEVICES

- A. All Electric motor current characteristics are as shown in equipment schedules on drawings and as specified hereinafter in this Specification. The Contractor shall refer to the Electrical Plans and shall confirm all motor voltage, amperage and phase characteristics before processing submittals or ordering equipment. If any

equipment is installed different from the supplied electrical power, it is the contractor's responsibility to correct equipment to the required electrical characteristics.

- B. All electrical devices of a type normally listed by Underwriters Laboratories, Inc. shall bear U.L. label of approval.

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Remove all equipment, fans, ductwork and exhaust grilles, supports, controls including control wire, conduits, control panels and any related equipment as indicated or noted on plans. Dispose of as directed by Owner.
- B. Remove all plumbing fixtures and fittings, water piping, gas piping, equipment, and supports as indicated on plans. Dispose of as directed by Owner.
- C. Any piping or ductwork to be reused to complete the project shall be capped immediately after removal of the demolished piping or ductwork.
- D. All existing piping and ductwork "to remain" shall be firmly secured with temporary supports approved by the Architect until final supports or installation is complete.
- E. Any waste piping including vents and drains, to be reused to complete the project shall be capped immediately after removal of the demolished piping. Cap or cover any open drains "to remain" prior to demolition work.
- F. All existing water and waste pipe "to remain" shall be flushed out prior to connection to any new work. All ductwork shall be blown out prior to the installation of new diffusers and grilles.
- G. All mechanical or plumbing equipment or fixtures to be reused shall be stored and protected in a clean area. The items shall be thoroughly cleaned before reinstallation.
- H. Any existing piping in a demolished area, and not shown on the plans, shall be rerouted and reconnected to piping outside of the demolished area.

3.2 GENERAL EQUIPMENT INSTALLATION REQUIREMENTS

- A. Install equipment to provide neat appearance, required manufacturer's access, and required space to allow replacement or maintenance. Provide bases, supports, anchor bolts, and other items required to install equipment. Installation shall be level and braced per CBC.
- B. Equipment shall operate quietly and without objectionable vibration. Excessive vibration, other than from specified equipment operating at optimum conditions,

shall be the Contractor's responsibility and shall be eliminated as directed by Architect.

3.3 COORDINATION OF WORK

- A. Coordinate Work of this Section with Work of other Sections to avoid conflicts. If required, provide shop drawings and submit to Architect for approval.
- B. Insure that Work of other Sections is suitable to accommodate Work of this Section.

3.4 ADEQUACY OF FURRING

- A. Conceal piping and ductwork in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect prior to ordering materials and fabrication of components.

3.5 PROTECTION AND CLEANING

- A. Protect equipment from dirt, moisture, and mechanical damage during construction. Restore or replace damaged equipment to original condition.
- B. Keep interior of piping and ductwork free of foreign material during construction. Flush piping systems with test medium specified under Piping Tests before installing equipment and appurtenances or making final connections.

3.6 CLOSING-IN OF UNINSPECTED WORK

- A. Do not conceal or cover Work before tests and observations are completed. Uncover Work prematurely closed in and repair resulting damage to all Work, if requested by Architect, Engineer, or Project Inspector.

3.7 DAMAGE

- A. Repair or replace items damaged by leaks or overflow from Work provided under this Section and for any damage to any part of the project site, for a period of 1 year after notice of completion date. This is in addition to and not a limitation of other rights the Owner may have against the contractor under the Contract Documents.

3.8 MECHANICAL SYSTEM TESTING

- A. Furnish all test pumps, gauges, and equipment. Test all safety controls and devices.
- B. For air tests, install a calibrated test pressure gauge in the piping system to observe any loss in pressure. Calibrate the test pressure gauge with a dead weight tester within 15 days before use and certify by initial and date on a sticker applied to the dial face. Maintain the required test pressure for the time indicated. Brush joints

with a soapy water solution to check for leaks if the required pressure cannot be maintained.

- C. After any test, repair all leaks found as directed and re-test as necessary until the system is proven tight.
- D. Before applying test pressure to any piping systems the Contractor shall be responsible for isolating all equipment e.g. control valves, regulators, relief devices, tanks and any other line accessories, which would otherwise be damaged by the test pressure.
 - 1. Soil, Waste, Vent and Condensate Drainage:
 - a. Entire System: Tightly close all openings except the highest one. Fill to overflowing with water.
 - b. Sections of System: Tightly close all openings except the highest opening of the section under test. Fill section with water to test each section with a minimum 10-foot head of water except for the uppermost 10 feet of the system.
 - c. Allow to stand for (4) hours or longer, as required to complete the inspection.
 - 2. Domestic Water: Fill with water and test at 150 psig. Retain for (4) hours.
 - 3. Refrigerant: Pressurize the system with nitrogen to 150 psig and hold for 24 hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.
- E. After all Systems have been tested as outlined, all flow rates shall be balanced, and all control devices adjusted. See Section 23 0000.
- F. The equipment and installations shall be operated by the Contractor and he shall demonstrate that all Systems are performing according to the requirements of the Plans and Specifications and to the satisfaction of the Architect, Engineer and Owner.

3.9 CUTTING AND PATCHING

- A. The Contractor shall do all cutting and patching which may be required for the installation of the Work under this Division of the Specifications. Patching shall be of the same quality, materials and finish as, and shall match accurately, all surrounding construction. No cutting of the Structure shall be permitted without the approval of the Architect.
- B. Wherever concrete or paved surfaces are cut to provide for the installation under this Section, the Contractor shall restore the surfaces to their original condition.

Subgrade materials, concrete, and paving materials, along with the placement of same, shall be in accordance with the respective Sections of this Specification as they apply to the installation of such material.

3.10 INSTALLATION OF PIPING, DUCTWORK AND EQUIPMENT

- A. The installation of piping, ductwork, and equipment shall be made in such a manner to clear beams and obstructions. Do not cut into or reduce the size of plates or any load carrying members without approval of the Architect. Check Drawings and Work of others to prevent interference. Deviations of the Work determined by the Architect shall be installed by the Contractor without additional cost.
- B. Install piping and ductwork promptly, cap or plug open ends of pipe. No piping shall be permanently covered by construction before inspection and approval. Piping and ductwork shall be installed in accordance with best practice and recommendations of the manufacturer.
- C. Conceal piping and ductwork unless indicated otherwise. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Remove defective material from site. Install piping generally level, free of traps and unnecessary bends to conform with building requirements, and provide space for other work. Piping to be free of unusual noises. Avoid any possible galvanic action by isolating dissimilar metals with suitable Dielectric Insulating Fittings.
- D. Unless called for otherwise, hereinafter in this Specification or by specific detail on the Drawings, all water pipes in contact with structure and/or hangers shall be suitably isolated. In the case of uninsulated pipe, "Trisolators" or equal shall be used.
- E. Protect enameled or polished equipment from damage, tool marks, etc.

3.11 STERILIZATION OF PIPES

- A. After preliminary purging of the Systems, the entire domestic potable water system pertaining to Work under this Contract shall be chlorinated in accordance with American Water Works Association, State of California Health and Safety Code procedure for disinfecting water mains. A thorough flushing operation shall be run upon completion of sterilization. Contractor shall then arrange with local health authority for test on mains and water systems and provide three (3) copies of test results to the Architect.

3.12 SEISMIC BRACING

- A. It shall be required that pipes, ducts and conduits be supported and braced per the most current edition of SMACNA "Seismic Restraints Manual Guidelines for Mechanical Systems".
- B. When the SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems" does not specifically address the size of duct or pipe to be braced, the following shall apply:
 - 1. All ducts shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and State Inspector.
 - 2. All pipes shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and State Inspector. Absolutely, no "Plumber's Tape" shall be used anywhere on this project.
- C. The SMACNA Manual can be obtained through SMACNA online. Contractor shall obtain manual prior to the start of any work.

3.13 OPERATION AND INSTRUCTION

- A. The Contractor shall furnish competent Technicians to supervise start-up operations of equipment specified by the Architect or Engineer and to instruct Owner's operators. The Contractor shall furnish six complete sets of operating instructions and service manuals to the Architect.
- B. Instruction period shall be started after instruction books and service manuals have been submitted to and approved by the Architect and shall be at hours (regular and non-regular) arranged by the Architect.
- C. Service manuals shall include oiling, cleaning, and servicing data, compiled in clearly and easily understood form and in a durable binder. Data shall show all serial numbers of every piece of equipment and complete list of replacement parts.

3.14 WARRANTY

- A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or Owner.

END OF SECTION 23 00 13

SECTION 26 00 00 - GENERAL ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. This specification shall apply to all phases of Work hereinafter specified, shown on Drawings, or as required to provide a complete installation of electrical systems for this Project. Work required under this specification is not limited to just the Electrical Drawings - refer to Architectural, Structural, Landscape, and Mechanical/Plumbing Drawings, as well as all other drawings applicable to this project, which designate the scope of work to be accomplished. The intent of the Drawings and Specifications is to provide a complete and operable electrical system that includes all documents that are a part of the Contract.
1. Work Included: Furnish labor, material, services and skilled supervision necessary for the construction, erection, installation, connections, testing, and adjustment of all circuits and electrical equipment specified herein, or shown or noted on Drawings, and its delivery to the Owner complete in all respects ready for use.
 2. The electrical Work includes installation or connection of certain materials and equipment furnished by others. Verify installation details, installation and rough-in locations from the actual equipment or from the equipment shop drawings.
- B. Electrical Drawings: Electrical Drawings are diagrammatic, and are intended to convey the scope of work, indicating intended general arrangement of equipment, conduit and outlets. Follow Drawings in laying out Work and verify spaces for installation of materials and equipment based on actual dimensions of equipment furnished.

1.2 QUALITY ASSURANCE

- A. Design, manufacture, testing and method of installation of all apparatus and materials furnished under requirements of these specifications shall conform to latest publications or standard rules of the following:
1. Institute of Electrical and Electronic Engineers - IEEE
 2. National Electrical Manufacturers' Association - NEMA

3. Underwriters' Laboratories, Inc. - UL
 4. National Fire Protection Association - NFPA
 5. Federal Specifications - Fed. Spec.
 6. American Society for Testing and Materials - ASTM
 7. American National Standards Institute - ANSI
 8. National Electrical Safety Code - NESC
 9. Insulated Cable Engineers Association - ICEA
 10. American Institute of Steel Construction - AISC
 11. State and Municipal Codes In Force In The Specific Project Area
 12. Occupational Safety and Health Administration (OSHA)
 13. Electronics Industries Association/Telecommunications Industry Association (EIA/TIA)
 14. California Electrical Code - CEC
 15. Local Authority Having Jurisdiction (AHJ) Published Electrical Standards and Codes
- B. Perform Work in accordance with the National Electrical Code, applicable building ordinances, and other applicable codes, hereinafter referred to as the "Code." The Contractor shall comply with the Code including local amendments and interpretations without added cost to the Owner. Where Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply unless variance is approved.
1. Comply with all requirements for permits, licenses, fees and codes. The Contractor, at Contractor's expense, shall obtain all permits, licenses, fees, special service costs, inspections and arrangements required for Work under this contract, unless otherwise specified.
 2. Comply with requirements of the applicable utility companies serving this Project. Make all arrangements with utility companies for proper coordination of Work.

1.3 GENERAL REQUIREMENTS

- A. Guarantee: Furnish a written guarantee for a period of (1) one-year from date of acceptance.
- B. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to ensure complete and operable systems as required by the Owner and Engineer.
- C. All Core Cutting, Drilling, and Patching:
 - 1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications and the Concrete section of the Specifications.
 - 2. No holes will be allowed in any structural members without the written approval of the Project's Structural Engineer.
 - 3. For penetrations of concrete slabs or concrete footings, the work shall be as directed in the Concrete Section of Specifications.
 - 4. The Contractor shall be responsible for patching and repairing surfaces where he is required to penetrate for work under this contract.
 - 5. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface shall be painted or finished to match the existing surface.
- D. Verifying Drawings and Job Conditions:
 - 1. The Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.
 - 2. The Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment(s) shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

1.4 WORK IN COOPERATION WITH OTHER TRADES

- A. Examine the Drawings and Specifications and determine the work to be performed by the electrical, mechanical and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper

operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.

- B. Provide a conduit-only system for low voltage wiring required for control of mechanical and plumbing equipment described in this or other parts of the Contract Documents. Install all control housings, conduits, and backboxes required for installing conductors to the controls.
- C. Install separate conduits between each heating, ventilating and air conditioning sensing device and its control panel and/or control motor. Before installing any conduit for heating, ventilating and air conditioning control wiring, verify the exact requirements from the control diagrams provided with the equipment manufacturer's shop drawings.

1.5 TESTING AND ADJUSTMENT

- A. Upon completion of all electrical work, the Contractor shall test all circuits, switches, light fixtures, lighting control and dimming systems including distributed systems, UPSs, generators, SPDs, lighting inverters, transfer switches, motors, circuit breakers, motor starters and their auxiliary circuits and any other electrical items to ensure perfect operation of all electrical equipment.
- B. Equipment and parts in need of correction and discovered during such testing, shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the Owner.
- C. All circuit(s) shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.
- D. All test reports, including copies of any required Energy Code Acceptance Forms (e.g. CA Title 24 Acceptance for Code Compliance Forms) should be submitted to the Engineer at completion of project.

1.6 IDENTIFICATION

- A. Nameplates shall be provided for unit substations, switchgear, switchboards, distribution boards, distribution panels, panel boards, motor control centers, transformers, transfer switches, contactors, starters, disconnect switches, enclosed circuit breakers/switches, inverters, UPSs, PDUs, RDCs, SPDs, lighting control panels, dimming panels, door releasing system panels, fire alarm/central monitoring

terminal cabinets/power supplies/control panels, and all low voltage system terminal and control cabinets.

1. Nameplate inscriptions shall be identical to the equipment designations indicated in plans and specifications. Nameplates shall be engraved with the device designation/identification on the top line, source identification for the device on the 2nd line per CEC, Art 408.4 and load designation for the device on the bottom line. Where load designation consists of a branch circuit, omit bottom line. Where device designation is not indicated on plans/specifications, Contractor shall submit a written clarification request to the Engineer.

Example: Transformer 1TA

Source Disconnecting Location: Switchboard MSA located in Rm 110
Load: Panels 1LA and 1 LB

2. All circuit breakers/fuses in switchgear, switchboards, distribution boards, distribution panels, UPS output circuit breakers, PDU sub-feed circuit breakers and motor control centers shall have individual nameplates located immediately adjacent to the respective device. Nameplate inscription shall identify the downstream equipment or device served by the circuit breaker or fuse.
- B. Identification nameplates, UON, shall be laminated/extruded modified acrylic that is 3/32" thick, UV-stabilized, matte finish, suitable for use in 180 deg. F ambient, with beveled edges and engraved white letters 3/8" high, minimum, on 1-1/2" high black background (utility/normal and optional standby power systems) for single line of text. Where two lines of text are required, provide minimum 2" high nameplate. Where three lines of text are required, provide minimum 2.5" high nameplate.
 - C. Identification nameplates for new switchgear, switchboards, distribution boards, distribution panels, panel boards and motor control centers shall be attached with switchgear manufacturer-provided screws via switchgear manufacturer factory pre-drilled holes. A factory option to rivet identification nameplates to the equipment is only acceptable if screw-fastened nameplates are not an available option from the switchgear manufacturer. Field drilling or other mechanical attachment methods that change/void the NEMA or NTRL rating of the enclosure are strictly forbidden.
 - D. Identification nameplates for transformers, transfer switches, disconnect switches, enclosed circuit breakers/switches, inverters, UPSs, PDUs, RDCs, SPDs, lighting control panels, dimming panels, door releasing system panels, terminal cabinets and all circuit breakers/fuses in switchgear, switchboards, distribution boards,

distribution panels, UPS output circuit breakers, PDUs, PDU sub-feed circuit breakers, and motor control centers shall be attached to the equipment by self-adhesive backing integral to the nameplates. When equipment is located outdoors, provide nameplates without self-adhesive backing and attach to equipment using weather-rated, UV-resistant epoxy. In all cases, clean surfaces before applying identification nameplates parallel to equipment lines.

- E. Warning Placards, as required by General Single Line Diagram Notes for multiple power sources, or instruction placards, as required for all kirck-key interlock schemes, all UPS bypass procedures or as required elsewhere in the plans/specifications shall be engraved 1/2" high white lettering on a red background using the same material specified for identification nameplates with a self-adhesive backing. Warning/instruction placards shall be attached to the face of the equipment directly related to the placards. Provide a formal placard submittal for review by the Engineer prior to ordering any warning/instruction placards. In all cases, clean surfaces before applying warning/instruction placards parallel to equipment lines.
- F. Receptacles that are part of a UL-listed under floor computer room whip assembly, ceiling and/or cable/ladder tray-mounted receptacles used in lab, manufacturing, commercial kitchen environments or that are serving telecom/data/AV racks and cabinets shall have identification nameplates located on the wiring device plate cover. Nameplates shall be self-adhesive, 3/32" thick Micarta with beveled edges, engraved 1/4" high white lettering on black background with serving power source, circuit identification and NEMA/IEC receptacle type. Use of two (2) separate nameplates per device plate cover is acceptable. Affix nameplates to be visible when plugs are occupying receptacles.
- G. See wiring device section of this specification for wiring device plate cover labeling requirements.
- H. See drawings for panel board schedule directory installation requirements.
- I. See conduit installation section of this specification for conduit labeling requirements.

1.7 FINAL INSPECTION AND ACCEPTANCE

- A. After all requirements of the Specifications and/or the Drawings have been fully completed; representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.

- B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

1.8 RECORD DRAWINGS

- A. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of drawings. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.9 APPROVALS, EQUALS, SUBSTITUTIONS, ALTERNATIVES, NO KNOW EQUAL

- A. Approvals: Where the words (or similar terms) "approved", "approval", "acceptable", and "acceptance" are used, it shall be understood that acceptance by the Owner, Architect and Engineer are required.
- B. Equal: Where the words (or similar terms) "equal", "approved equal", "equal to", "or equal by", "or equal" and "equivalent" are used, it shall be understood that these words are followed by the expression "in the opinion of the Owner, Architect, and Engineer." For the purposes of specifying products, the above words shall indicate the same size, made of the same construction materials, manufactured with equivalent life expectancy, having the same aesthetic appearance/style (includes craftsmanship, physical attributes, color and finish), and the same performance.
- C. Substitution: For the purposes of specifying products, "substitution" shall refer to the submittal of a product not explicitly approved by the construction documents/specifications.
 - 1. Substitutions of specified equipment shall be submitted and received by the Engineer ten (10) days prior to the bid date for review and written approval. Regulatory Agency approval for all substitutions will be the sole responsibility of the Contractor. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letterform and identify the specified values/materials alongside proposed equal

values/materials. In addition, catalog brochures and samples, if requested, must be included in the submittal. ONLY PRE-BID APPROVED PRODUCTS, ISSUED VIA A FORMAL BID ADDENDUM TO ALL BIDDERS, WILL BE ALLOWED ON THE PROJECT. REGARDLESS OF THE APPROVAL ON ANY SUBSTITUTION, ALL BIDS SHALL BE BASED ON THE PRODUCTS EXACTLY AS SPECIFIED. PRICING FOR EACH APPROVED SUBSTITUTION SHALL BE INCLUDED IN THE BID SUBMITTAL AS A SEPARATE LINE ITEM.

2. In the event that written authorization is given for a substitution, after award of contract, the Contractor shall submit to the Engineer quotations from suppliers/distributors of both the specified and proposed equal material for price comparison, as well as a verification of delivery dates that conform to the project schedule.
 3. In the event of cost reduction, the Owner will be credited with 100 percent of the reduction, arranged by Change Order.
 4. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.
- D. Alternates/Alternatives: For the purposes of specifying products, "alternatives/alternates" may be established to enable the Owner/Architect/Engineer to compare costs where alternative materials or methods might be used. An alternate price shall be submitted in addition to the base bid for consideration. If the alternate is deemed acceptable, written authorization will be issued.
- E. No Known Equal: For the purposes of specifying products, "No Known Equal" shall mean that the Owner/Architect/Engineer is not aware of an equivalent product. The Contractor will need to submit a "Substitution" item, per the requirements listed above, if a different product is proposed to be utilized.

1.10 SHOP DRAWINGS/SUBMITTALS

- A. Shop Drawings/Submittals, unless required otherwise by general project specifications or instructions to bidders, shall be submitted in electronic format (PDF) to include a Letter of Transmittal (PDF), which shall give a list of the drawings submitted with dates and/or system(s) components contained within the submittal. Drawings and material cut sheets shall be complete in every respect and edited/marked to indicate specific items being provided. Printed/Hard copies are not acceptable.

- B. The Shop Drawings/Submittals shall be marked with the name of the project, numbered consecutively, and bear the approval of the Contractor as evidence that the Contractor has checked the Drawings. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.
- C. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in the Contractor's letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment that may be caused by the substitution. Samples shall be submitted when requested.
- D. Only products listed as "Equal" within the contract documents, along with formally approved "Substitutions" will be reviewed. Products not conforming to these items will not be reviewed and will be returned to the Contractor for re-submittal.
- E. Review comments used in response to shop drawings/submittals are:
 - 1. "No Exception Taken" - Product approved as submitted.
 - 2. "Furnish as Corrected" - Re-submittal not required, although the Contractor shall provide the submitted product with corrections as noted.
 - 3. "Revise and Resubmit" - Re-submittal required with corrections as noted.
 - 4. "Rejected" - Re-submittal required based upon the originally specified product.
- F. Shop drawings shall be submitted on the following but not limited to:
 - 1. Lighting Fixtures, Lamps, and Ballasts.
 - 2. Switchgear, Switchboards, Distribution Boards, Motor Control Centers, Panel boards, and Bus Ducts; complete with overcurrent device information.
 - 3. Transformers.
 - 4. Fire Alarm System/Central Monitoring System.
 - 5. Wiring Devices.
 - 6. Lighting Control System/Dimming System Products.
 - 7. Pullboxes and Underground Vaults.

8. Terminal Cabinets
9. Lighting Inverters, UPSs, RDCs, PDUs, Generators, Transfer Switches, SPD Systems.
10. Cable Tray, Flexible Cable Tray and Cable Runway.
11. Power Poles and Floor Boxes.
12. Arc Flash, Short-Circuit and Coordination studies.
13. All other products called out on drawings that call for shop drawing submittal.

1.11 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRING DIAGRAMS

- A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the Owner at least four (4) copies of operating, maintenance, and servicing instructions, as well as four (4) complete wiring diagrams for the following, but not limited to, items or equipment:
 1. Lighting Control System/Dimming Systems.
 2. Fire Alarm System.
 3. Transformers.
 4. Switchgear, Switchboards, Distribution Boards, Motor Control Centers, Panel boards, and Bus Ducts; complete with overcurrent device information
 5. Lighting Inverters, UPS's, PDUs, Generators, Transfer Switches, SPD Systems
- B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Four (4) copies shall be presented to the Owner.

1.12 INTERRUPTION OF SERVICE/SERVICE SHUTDOWN

- A. Any interruption of electrical services, electrical circuits, electrical feeders, signal systems, communication systems, fire alarm systems, etc. required to perform work, shall meet the specific prior-approval requirements of the Owner. Such work shall be scheduled with the Owner to be performed at the Owner's convenience.

- B. Interruptions/outages of any of the Owner's systems and services mentioned above shall be scheduled to occur during other than the Owner's normal business hours. Any overtime costs shall be borne by the Contractor.
- C. See drawings for any additional requirements regarding outages, interruption and any temporary services required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials and Equipment: All electrical materials and equipment, including custom-made equipment, shall be new and shall be listed by Underwriter's Laboratories (UL) and bear their label or be listed and certified by a Nationally Recognized Testing Lab (NRTL) that is also recognized by the local Authority-Having-Jurisdiction (AHJ)
- B. Switchgear/Switchboards/Distribution Boards/Motor Control Centers:
 - 1. See general single line notes on single line drawing for more information.
- C. Panel boards – Branch Circuit:
 - 1. See drawings for panel board schedules and specifications.
- D. Transformers:
 - 1. See drawings for transformer schedules and specifications.
- E. Lighting Fixtures:
 - 1. See drawings for lighting fixture and lamp schedules and additional specifications. Furnish, install and connect a lighting fixture at each outlet where a lighting fixture type symbol (designated on plans) is shown as being installed. Each fixture shall be complete with all required accessories including sockets, glassware, boxes, spacers, mounting devices, fire rating enclosure and lamps.
 - 2. Ballasts: See lighting fixture schedule notes. All noisy ballasts shall be replaced at no cost to the Owner.
 - 3. Lamps: See lamp/fixture schedule and lamp/lighting fixture schedule notes.
- F. Wiring Devices:

1. Provide wiring devices indicated per plan. Devices shall be specification grade. Acceptable manufacturers are Leviton, Pass and Seymour and Hubbell. Provide all similar devices of same manufacturer, unless indicated otherwise. All device colors shall be from the full range of manufacturer standard color options as selected by the Architect. This selection will be made during the shop drawing review process

a. Wiring Devices (Decora)

- | | | |
|-----|--|--------------------------|
| 1) | Convenience Receptacle | #16252- ??? |
| 2) | Dedicated Receptacle | #16352-??? |
| 3) | Convenience I.G. Receptacle | #16262-IG-??? |
| 4) | Dedicated I.G. Receptacle | #16362-IG-??? |
| 5) | Convenience G.F.C.I. Receptacle | #GFT1-??? |
| 6) | Dedicated G.F.C.I. Receptacle | #GFNT2-??? |
| 7) | Convenience Hospital Grade Receptacle | #16252-HG?-??? |
| 8) | Dedicated Hospital Grade Receptacle | #16352-HG?-??? |
| 9) | Convenience G.F.C.I. Hospital Grade | #GFNT1-HG? |
| 10) | Dedicated G.F.C.I. Hospital Grade | #GFNT2-HG? |
| 11) | Tamper Resistant Convenience Receptacle | #TDR15-??? |
| 12) | Tamper Resistant Dedicated Receptacle | #TDR20-??? |
| 13) | Tamper Resistant GFCI Receptacle | #GFTR2-??? |
| 14) | Tamper Resistant. Convenience. G.F.C.I. Hospital Grade Receptacle | #GFTR1-HG? |
| 15) | Tamper Resistant. Dedicated. G.F.C.I. Hospital Grade Receptacle | #GFTR2-HG? |
| 16) | Weather/Tamper Resistant GFCI Receptacle | #GFWT2-??? |
| 17) | Convenience Simplex Receptacle | #16251-??? |
| 18) | Dedicated Simplex Receptacle | #16351-??? |
| 19) | Recessed Clock Receptacle | #5361-CH-???(Non-Decora) |
| 20) | Single Pole Switch | #5621-2-??? |
| 21) | Double Pole Switch | #5622-2-??? |
| 22) | Three Way Switch | #5623-2-??? |
| 23) | Four Way Switch | #5624-2-??? |
| 24) | Pilot Light Switch "On" | #5628-2-??? |
| 25) | Pilot Light Switch "Off" | #5631-2-??? |
| 26) | Projection Screen Switch | #5657-2-??? |
| 27) | Low Voltage Momentary Switch | #5657-2-??? |
| 28) | Keyed Switch | #1221-2L-???(Non-Decora) |
| 29) | Door Jam Switch | #1865-??? |

- b. Use of dedicated receptacles is required where plans depict a branch circuit supplying only a single simplex or duplex receptacle.

Use of controlled receptacles is required where depicted on plans - see controlled receptacle specifications for additional information.

2. I.G. (isolated ground) receptacle bodies shall be of a basic color specified above with an orange triangle to symbolize isolated ground.
3. H.G. (hospital grade) receptacle bodies shall be of a basic color specified above with a green circle to symbolize hospital grade.
4. When shown circuited with an I.G. conductor, receptacles shall be of an I.G. type. As an example, a NEMA L6-30R denoted on the plans and shown circuited with an I.G. conductor shall be an I.G. version of that receptacle.
5. Wiring devices located in wood finished areas shall generally be black unless otherwise indicated by the Architect.
6. Wiring devices located in mirrors shall generally be white with stainless steel cover plates unless otherwise indicated by the Architect.
7. In addition to other device requirements listed elsewhere in this specification and CEC Articles 406.12 & 517.18, all 125V & 250V, 15A and 20A, non-locking receptacles shall be Tamper-Resistant when located in the following locations:
 - a. In dwelling units per CEC Article 210.52.
 - b. In guest rooms and guest suites of hotels and motels.
 - c. In child care or daycare facilities.
 - d. In preschool and elementary education facilities.
 - e. In business offices, corridors, waiting rooms, and the like in clinics, medical and dental offices and outpatient facilities.
8. Wiring device cover plates located on recessed boxes shall be commercial grade nylon. Plate color shall match wiring device color UON on plans. Cover plates utilized on surface mounted boxes shall be metal. Plastic cover plates are unacceptable.
9. Except as otherwise noted, all wiring device plates on the project shall be labeled with panel and circuit number(s) utilizing a Brother P-Touch labeling system with 1/2" tape (yellow on black) or equal by Herman-Tellerman or Panduit. Locate label on the concealed side of the wiring device plate. Handwritten labels are unacceptable.

10. The Contractor shall provide duplex receptacle outlets in the appropriate configurations necessary to comply with applicable energy code requirements for controlled receptacles and as shown on plans. All wiring devices indicated to be controlled receptacles shall be NEMA-approved, electrical code-compliant with factory markings on the face of the receptacle(s) with the word "Controlled" or utilize further markings and symbols to indicate which receptacles on each outlet is/are controlled. Stickers, field-applied markings or other non-permanent markings are not acceptable. Where a GFCI receptacle outlet is required to be controlled, provide an adjacent controlled duplex receptacle outlet connected on the load side of the GFCI outlet. Generally, one receptacle in a duplex receptacle outlet is required to be controlled. It may be the lower receptacle or upper receptacle based on manufacturer offering. However, the controlled receptacle location within a controlled receptacle outlet shall remain consistent throughout the project. Where an existing duplex receptacle outlet is required to be controlled, provide a new wiring device with the appropriate control configuration necessary to comply with plans. All controlled receptacles shall be connected to a branch circuit controlled by an occupancy sensor-based or relay panel lighting control system. Acceptable manufacturers are Leviton, Pass and Seymour and Hubbell.
 11. The following wiring device plates shall have custom engraving:
 - a. Key operated switches, switches with pilot lights, and switches for the control of motors, heaters and ventilators. Engraving shall be black and occur on the exposed side of the plate indicating the motor, heater, or ventilator controlled.
 - b. Receptacles on optional standby generator and/or UPS power shall have custom engraved plates with the words "Generator" or "UPS" in black letters. In addition, where located in telecommunications closets, IDFs, server rooms, data centers, labs (wet, dry or electronic) indicate panel board and circuit number.
 - c. All stainless steel and nylon device plates shall be engraved using a rotary engraving process except for black lettering on stainless steel device plates which may be accomplished via laser etching process. All lettering shall be 3/16" high. Provide a dimensioned submittal drawing detailing a typical device faceplate with engraving.
- G. Weatherproof Outlet Covers/Assemblies: All Receptacles identified as weatherproof on the drawings shall be weather-resistant, tamper-resistant, GFCI type and equipped as follows:

1. Type WP-A: Recessed wall box with a hinged, lockable, cast aluminum, self-closing, gasket-equipped door that is wet location-listed rain tight while "in use". Unit shall comply with CEC Article 406.9(A) and (B). UON on drawings, provide a minimum of 2 separate compartments suitable for installation of power receptacles, AV or communications outlets. Additionally, unless otherwise noted on drawings, provide the following:
 - a. A 20A weather-resistant, tamper-resistant, GFCI duplex receptacle in the first compartment. Provide branch circuiting per plans.
 - b. A blank metal plate suitable for field installation of power, AV or communications devices in the second compartment.
 - c. Where indicated on plans as requiring data, AV, or other low voltage service outlet, provide minimum 3/4" C.O. with pull string routed from the second compartment to nearest low voltage pull box. Where shown mounted in a building wall, any blank/unused compartment shall be equipped min. 3/4" C.O. with pull string routed to the nearest accessible ceiling space.
 - d. See wiring device section of this specification for additional wiring device plate cover labeling requirements.
 - e. 1 key minimum per device (minimum of 2 per project) to the Owner's project manager upon completion of project.
 - f. Custom color powder coat finish as selected by Architect - Include all costs in base bid for same.
 - g. In locations with sufficient wall depth, provide 6" wide x 6" tall x 5-1/2" deep recessed wall box (C.W. Cole #TL310-WCS-K1-CUSTOM COLOR).
 - h. In locations utilizing shallow stud walls construction or other walls of insufficient depth, provide 10-3/4" wide x 7-3/8" tall x 3-7/8" deep recessed wall box (C.W. Cole #TL310-WCS-SH-K1 -CUSTOM COLOR).
 - i. See drawings for additional details.
2. Type/Subscript WP-B: Wet location-listed raintight while "in use" cast copper-free aluminum, extra-duty, lockable cover with baked aluminum lacquer finish and one gang, weather-resistant, tamper-resistant GFCI receptacle. Hubbell WP26E series. Polycarbonate covers are unacceptable.

Unit shall comply with CEC Article 406.9(A) and (B). Contractor shall powder coat cover assembly to a custom color where receptacle locations are deemed by the Architect to be in aesthetically sensitive or public spaces. Custom color as selected by Architect.

- H. Motor Controllers/Starters: See drawings for motorized equipment schedules and specifications.
- I. Circuit Breakers:
 - 1. Service entrance circuit breakers smaller than 400A (Amp) frame shall be thermal-magnetic trip with inverse time current characteristics unless otherwise indicated below. Service entrance main circuit breakers and main circuit breakers, 400A frame and larger, shall be 100% rated, solid-state type as outlined in this specification. All other service entrance circuit breakers, 400A frame and larger, shall be 100% rated, solid-state type as outlined in this specification.
 - 2. All non-service entrance circuit breakers 225A and larger shall be thermal magnetic type and have continuously adjustable instantaneous pick-ups of approximately 5 to 10 times trip rating. Breakers shall have either tamper-resistant rating dials or easily changed trip rating plugs with trip ratings as indicated on the Drawings. Rating plugs shall be interlocked so they are not interchangeable between frames. Additionally, all non-service entrance circuit breakers, 600A frame and larger, located in 480V, 3-phase, 3-wire or 277/480V, 3-phase, 4-wire switchgear, distribution boards, panel boards or busway plugs shall be solid state, 100% rated. Breaker shall have built-in test points for testing long delay, short delay and instantaneous, and ground fault (where shown) functions of the breaker by means of a 120V operated test kit. Contractor shall utilize a test kit capable of testing all breakers 400A and above - at the Engineer's request.
 - 3. All non-service entrance circuit breakers less than 225A shall be molded plastic case, air circuit breakers conforming to UL 489. Provide breakers with thermal magnetic trip units, and a common trip bar for two- or three-pole breakers, connected internally to each pole so tripping of one pole will automatically trip all poles of each breaker. Provide breakers of trip-free and trip-indicating bolt-on type, with quick-make, quick-break contacts. Provide single two- or three-pole breaker interchangeability. Provide padlocking device for circuit breakers as shown on the Drawings.
 - 4. Where a Current Limiting Circuit Breaker (CLCB) is indicated on drawings or as required elsewhere in this specification, provide a UL listed current limiting thermal magnetic circuit breaker(s) UON. An independently

operating limiter section within a molded case is not allowed. Coordinate CLCB ratings as required to protect electrical system components on the load side of the CLCB to include, but not limited to, protecting automatic transfer switches, panel boards and lighting control panels.

5. Where a solid-state circuit breaker is indicated on drawings or as required elsewhere in this specification, provide a solid-state circuit breaker with minimum five function complete with built-in current transformers. The five functions shall be independently adjustable and consist of Overload/Long Time Amp Rating, Long Time Delay, Short Time Delay, Short Circuit/Instantaneous Pickup, but may also include Shunt Trip and/or Ground Fault if so indicated on the Drawings. Rating plugs shall be interlocked so they are not interchangeable between frames. Breaker shall have built-in test points for testing long delay and instantaneous, and ground fault (where shown) functions of the breaker by means of a 120V operated test kit. Contractor shall utilize a test kit capable of testing all breakers 400A and above, at the Engineer's request.
6. Ground Fault Interrupting Breakers: Provide with molded plastic case, air circuit breakers, similar to above with ground fault circuit interrupt capability, conforming to UL Class A, Group 1.
7. Tandem or half-sized circuit breakers are not permitted.
8. Series-Rated Breakers: UL listed series-rated combinations of breakers can be used to obtain panelboard-interrupting ratings shown on Drawings. If series-rated breakers are used, switchboards, distribution boards, and panel boards shall be appropriately labeled to indicate the use of series-rated breakers. Shop drawing submittal shall include chart of UL listed devices, which coordinate to provide series rating.
9. Circuit breakers shall be standard interrupting construction. Panelboard shall accept standard circuit breakers up to 100A.
10. Circuit breaker handle accessories shall provide provisions for locking handle in the on or off position.
11. Shunt-trip equipped circuit breakers shall be provided on all elevator feeders.
12. Temperature compensating circuit breaker(s) shall be provided when located in outdoor enclosure(s) or when located in an enclosure subject to high ambient heat due to due nearby industrial processes, etc.

13. Provide 75 degree Celsius-rated conductor lugs/lug kits as required on all circuit breakers to accept conductor quantities and sizes shown on drawings.
 14. All circuit breaker terminations shall be suitable for use with 75-degree Celsius ampacity conductors. Listed, dual-rated pin terminals, straight or offset, are acceptable for use to in accommodating oversized or parallel conductor installations.
 15. Circuit breakers serving Fire Alarm or Central Monitoring panels and power supplies shall be red in color and lockable in the "ON" position.
- J. Disconnect Switches:
1. Non-fusible or fusible, heavy-duty, externally-operated horsepower-rated, 600V A.C: Provide NEMA 3R, lockable enclosures for all switches located on rooftops, in wet or damp areas and in any area exposed to the elements.
 2. Fusible switches shall be Class "R" when 600A or less or Class "L" when greater than 600A.
 3. Amperage, Horsepower, Voltage and number of poles per drawings: All shall be clearly marked on the switch nameplate.
 4. Provide the Owner's project manager with one (1) spare set of fuses and two (2) sets of fuse clips/fuses for every set of fuses on the project.
- K. Fuses:
1. Provide fuses at all locations shown on the Drawings and as required for supplemental protection:
 - a. Fuses shall be manufactured by Bussman, Shawmut, or equal.
 - b. All fuses shall be the product of a single manufacturer.
 2. Motor Protection:
 - a. Where rating of protective device is 600A or less, provide Bussman Class RK series current limiting fuses, having an interrupting rating of 200,000A RMS.
 - b. Where fuses feeding motors are indicated, but not sized, it shall be the responsibility of the Contractor to coordinate the fuse size with the motor to provide proper motor running protection.

- c. When rejection type fuses are specified (Class RK series) the fuse holder of all switches (specified in other Sections) shall be suitable for the fuses provided.
- L. Lighting Control/Dimming Systems:
1. See drawings for Lighting Control and/or Dimming Systems schedules and specifications.
- M. Fire Alarm System/Central Monitoring System:
1. See drawings for Fire Alarm System or Central Monitoring System specifications.
- N. Conduit:
1. Galvanized Rigid Conduit (GRC) shall be full weight threaded type steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metalizing, or sherardizing process.
 2. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242, and meet Federal Specification WWC-581 (latest revision).
 3. Electrical Metallic Tubing (EMT) shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces. EMT shall be dipped in a chromic acid bath to chemically form a corrosion-resistant protective coating of zinc chromate over galvanized surface.
 4. Flexible metal conduit shall be constructed of aluminum or hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Use only as directed in writing by the Engineer with the exception of 400 Hz feeders and 400 Hz branch circuits which shall be run in flexible aluminum conduit.
 5. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory-installed fittings. For outdoor installations and motor connections only unless otherwise noted on drawings.
 6. Factory assembled, or off-site assembled wiring systems (such as Metal Clad (MC) Cable, Type AC Cable, Type NM Cable, Type BX Cable, etc.) shall not be used unless otherwise indicated in the Allowed Specification

Deviations Section or Deductive/Additive Alternate Pricing Section generally located on the symbols list drawing.

7. Nonmetallic Flexible Tubing (ENT) shall not be used unless otherwise indicated in the Allowed Specification Deviations Section or Deductive/Additive Alternate Pricing Section generally located on the symbols list drawing. Use of ENT, if allowed, is strictly limited to use in CMU walls and parking structures decks or as directed in writing by the Engineer. See PART 3 - EXECUTION section in this specification for additional installation requirements.
8. Non-Metallic Conduit:
 - a. Polyvinyl chloride (PVC) rigid conduit, Schedule 40, Type II for underground installation only with solvent welded joints, conforming to Underwriters Laboratories, Inc. (UL) requirements, listed for exposed and direct burial application.
 - b. Conduit and fittings shall be produced by the same manufacturer.

O. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fittings shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.
2. Metallic condulet covers shall have the same finish as the fitting and shall be provided for the opening of each fitting where conductors do not pass through the cover.
3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.
4. UON all EMT fittings, connectors and couplings installed in concealed locations, areas not considered to be wet or damp locations by the AHJ, or areas not subject to physical damage, shall be steel, zinc or cadmium plated, threadless, compression, steel locking ring type with insulated throat. Where suitable for use, steel set screw fittings are allowed for trades sizes of 2" and smaller. Insulated throat is not required for fittings, connectors and couplings 1" and smaller.

5. All interior and exterior EMT fittings, connectors and couplings, 2" and smaller, installed in exposed or concealed locations that are considered by the AHJ to be wet or damp locations, shall be Raintite-listed, steel, zinc or cadmium plated, threadless, compression, steel locking ring type with insulated throat. If Raintite-listed, EMT fittings, connectors and couplings are unavailable for a given trade size or if conduit is installed in an area subject to damage – provide rigid metallic or intermediate metallic conduits, fittings, connectors and couplings as required.
 6. Flexible steel conduit connectors shall be a malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.
 7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.
- P. 600 Volt Conductors - Wire and Cable:
1. All conductors shall be copper. Provide stranded conductor for #10 AWG and larger or when making flexible connections to vibrating machinery. Use compression "fork" type connectors or transition to solid conductors when connecting to switches, receptacles, etc.
 2. Type THHN/THWN-2 thermoplastic, 600 volt, UL approved, dry and wet locations rated at 90 degrees Celsius, for conductors of all sizes from #12 AWG up to and including 1000 kcmil. RHH/RHW insulation is allowed only to provide an Electrical Circuit Protective System to comply with CEC Articles 695 and 700.
 3. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on outer covering at regular intervals.
 4. Wire and cable shall be factory color-coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color-coded and it shall be maintained throughout.
 5. Systems Conductor Color Coding:
 - a. Power 208/120V, 3PH, 4W:
 - 1) Phase A = Black
 - 2) Phase B = Red

- 3) Phase C = Blue
 - 4) Neutral = White or White with Phase Color Tracer
 - 5) Switch legs = Purple (Switch legs shall also be identified separately by numerical tags).
 - 6) Travelers = Purple with Black stripe or Pink.
- b. Power 480/277V, 3PH, 4W:
- 1) Phase A = Brown
 - 2) Phase B = Orange
 - 3) Phase C = Yellow
 - 4) Neutral = Grey or Grey with Phase Color Tracer
 - 5) Switch legs = Purple (Switch legs shall also be identified separately by numerical tags).
 - 6) Travelers = Purple with black stripe or Pink..
- c. Ground Conductors: Green
- d. Isolated Ground Conductors: Green with continuous yellow stripe.
- e. Fire Alarm System: As recommended by the manufacturer.
6. All color-coding for #12 through #6 AWG conductor shall be as identified above. Conductors #4 AWG and larger shall be identified with utilizing phase tape at each termination.
7. No conductors carrying 120V or more shall be smaller than #12 AWG.
8. Aluminum conductors shall not be used.
9. Wire-pulling compounds used as lubricants in installing conductors in raceways shall only be "Polywater J". No oil, grease, graphite, or similar substances may be used. Pulling of #1/0 or larger conductors shall be done with an approved cable pull machine. Other methods; e.g. using vehicles and block and tackle to install conductors are not acceptable.
- Q. Junction and Pullboxes:
1. For interior dry locations, boxes shall be NEMA 1 galvanized one-piece drawn steel, knockout type, with removable, machine screw secured covers.
 2. For outside, damp or surface locations, boxes shall be NEMA 3R heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.

3. For in-grade applications, junction and pull boxes shall be pre-cast concrete or molded fiberglass manufactured by Christy, Brooks-Jensen, or Utility Vault Co. Fiberglass boxes shall:
 - a. Be used only in landscape planter areas that are not subject to damage from lawnmowers, tractors and other machinery.
 - b. Not be used in lawn or turf areas.
 - c. Not exceed 11" W x 17" L in size unless required to be larger to meet code requirements.
 4. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required.
 5. All boxes located in traffic areas shall be traffic rated.
- R. Outlet Boxes:
1. For fixtures, boxes shall be galvanized, one-piece drawn steel, knockout type equipped with 3/8" fixture studs and plaster rings where required.
 2. For convenience outlets, wall switches, or other devices, outlet boxes shall be galvanized one-piece drawn steel, knockout type 4" x 4"x 2-1/8" minimum size with plaster rings as required.
 3. For locations where standard boxes are not suitable due to number and size of conduit to be terminated, special boxes shall be designed to fit space or meet other requirements, and submitted for approval.
 4. For exposure to weather, damp locations, or surface mounting, outlet boxes shall be heavy cast aluminum or cast iron with threaded hubs; covers shall be watertight with gaskets and non-ferrous screws.
 5. Outlet boxes used for support of ceiling fans shall be galvanized, one-piece drawn steel, knockout type equipped with bracing bars and plaster rings where required and listed for ceiling fan support use. Such boxes shall be labeled and capable of supporting ceiling fan weights up to 70 pounds.
 6. See drawings for floor box installation notes and specifications.
- S. Painting: Terminal cabinets, panels, junction boxes, pull boxes, etc., and conduit installed in public view shall be painted with colors selected by the Architect to match the subject surfaces. Refer to painting section of the specifications for additional requirements.

T. Seismic Design, Certification and Anchoring of Electrical Equipment:

1. Contractor shall include all costs in the base bid for labor, materials, all special inspections and structural engineering design necessary to meet the Seismic Design Requirements for Non-structural Components (Chapter 13, ACE SEI 7-05 Minimum Design loads for Buildings and Other Structures) as required by IBC, or CBC Section 1708 and as related to the installation all electrical equipment furnished under this contract. See Specific Project Site Seismic Criteria on architectural and/or structural plans which include Building Occupancy Category, Seismic Design Category, Design Spectral Response Acceleration (S_{DS}), Height factor ratio (z/h) and Site Class. Non-structural Component Importance Factor (I_p) for a particular component shall be determined based on the following criteria:
 - a. $I_p = 1.0$: Non-life safety, Non-structural Components in an Occupancy Category IV Facility not required for continued operations of the facility or in any other Occupancy Category Facility where component failure will not impair continued operation of the facility.
 - b. $I_p=1.5$: Designated Seismic Systems are those non-structural components in any Occupancy Category IV facility (except as noted above) or that are a part of any code-defined Critical, Life Safety, Emergency and Legally Required Standby Electrical System. Additionally, those non-structural components containing hazardous materials shall be classified as Designated Seismic Systems. While Designated Seismic Systems are generally identified on the plans, they may include items such as generators, automatic transfer switches, UPS units and all associated electrical distribution equipment and components necessary for the designated seismic system to form a complete and operable system. The Contractor shall ultimately be responsible for identifying Designated Seismic Systems. For any electrical component either identified on the plans or determined by the contractor to be a Designated Seismic System, all line and load side electrical distribution systems supporting that Designated Seismic System (including, but not limited to, feeders, panel boards switchboards, transformers, all related component supports and attachments etc.) shall be considered a part of the designated seismic system for the purposes of code-compliance and seismic certification.
 - c. z/h - Height factor ratio: See plans for respective equipment locations.

2. Provide a delegated-design submittal for each of the following seismic-restraint systems to be used as required:
 - a. Restraint Channel Bracings consisting of MFMA-4, shop-or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end, with other matching components, and with corrosion-resistant coating; rated in tension, compression, and torsion forces.
 - b. Restraint Cables consisting of ASTM A 603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service, with a minimum of two clamping bolts for cable engagement.
 - c. Seismic-Restraint Accessories consisting of hanger rod/hanger rod stiffener assemblies, multifunctional steel connectors for attaching hangers to rigid channel bracings and/or restraint cables, bushings for floor and wall-mounted equipment anchor bolts and resilient isolation washers and bushings.
 - d. Mechanical Anchor Bolts consisting of drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.
 - e. Adhesive Anchor Bolts consisting of drilled-in and capsule anchor system containing resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide specific LEED-compatible environmentally-friendly resins and adhesives on all LEED projects. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.
3. Submittal shall include design calculations and details for selecting seismic restraints complying with performance requirements, design criteria, and analysis data signed and sealed by the contractor's structural engineer responsible for their preparation. Calculations shall include, but not be limited to, static and dynamic loading caused by equipment weight, operation, and seismic and, if applicable, wind forces required to select seismic and, if applicable, wind restraints and for designing vibration isolation bases. Provide seismic and wind-restraint detailing to support

system selection, arrangement of restraints, attachment locations, methods, and spacings with all components identified to include their strengths, directions and values of forces transmitted to the structure during seismic events and association with vibration isolation devices. Sizes of components shall be selected so strength will be adequate to carry present static and seismic loads to accommodate 25% spare future capacity within specified loading limits.

4. Any pre-approval and evaluation documentation shall have a California Office of Statewide Health Planning and Development (OSHPD) Special Seismic Certification Preapproval (OSP) demonstrating horizontal and vertical load testing and analysis showing maximum seismic-restraint ratings, by ICC-ES or another agency acceptable to authorities having jurisdiction. 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) that support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
5. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified elsewhere in the project specifications.
6. 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 connection is terminated to equipment that is anchored to a different structural element from the one supporting them as they approach equipment. Flexible connection limitations of the CEC shall apply.
7. Install seismic-restraint devices using methods approved by OSHPD or an agency acceptable to authorities having jurisdiction providing required submittals for component.
8. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by OSHPD or an agency acceptable to authorities having jurisdiction.
9. The contractor shall engage a qualified testing agency to perform tests and inspections as listed in other Project Specifications, but as a minimum shall include at least four of each type and size of installed anchors and fasteners selected by Architect. Schedule tests with Owner, through Architect, before connecting anchorage device to restrained component (unless post

connection testing has been approved), and with at least seven days' advance notice. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members as required. Test to 90 percent of rated proof load of device. Prepare and submit test and inspections reports.

- U. Trenching and Backfilling: Contractor shall be responsible for trenching and backfilling. Refer to Trenching and Backfilling section of the specifications for complete requirements.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Installation of Conduit and Outlet Boxes:

1. All conduit installed in the dry walls or ceilings of a building shall be steel tube (EMT), aluminum tube (EMT), or Intermediate Metal Conduit (IMC). Flexible conduit shall not be used in lieu of EMT, IMC or rigid conduit except as noted herein.
2. Galvanized rigid conduit (GRC) or intermediate metal conduit (IMC) shall be used as follows:
 - a. When noted on the drawings.
 - b. When considered exposed to damage by the local AHJ.
 - c. When installed in wet or damp locations and of a trade size where listed-Raintite fittings, connectors, couplings etc. are unavailable.
 - d. When installed in concrete and masonry. The use of ENT in CMU walls and parking structures may be allowed only as directed in writing by the Engineer. Request for ENT substitution must be made prior to bid and in accordance with pre-bid substitution requests requirements of these specifications.
3. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or steel-tube EMT and in accordance with CEC Article 342.
4. Flexible steel conduit shall only be permitted to be used at light fixture outlets and connections to vibrating electrical equipment. Except when

concealed in walls or other structural elements, all flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Include a separate insulated green ground conductor sized per CEC in each conduit. Other uses of flexible conduit shall be allowed only as approved in writing by the Engineer.

5. Flexible liquidtight conduit shall be installed in lieu of the flexible steel; where required by the CEC in damp and wet location, where exposed to weather, in refrigerated area (65°F or less), and/or between seismic joints. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches. Include a separate insulated green ground conductor sized per CEC in each conduit. Other uses of liquidtight flexible conduit shall be allowed as approved in writing by the Engineer on a case by case basis.
6. Rigid metallic conduit installed underground or embedded in concrete shall be 1" trade size minimum and shall be wrapped with 20 mil. Polyvinylchloride plastic tape, PVC conduit installed underground or embedded in concrete shall be 3/4" minimum trade size.
7. Conduit shall be run so as not to interfere with other piping fixtures or equipment.
8. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.
9. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.
10. Where conduit is underground, under slabs or grade, exposed to the weather, or in wet locations, make joints liquid tight and gas tight.
11. All metal conduit in masonry and concrete and where concealed under floor slabs shall have joints painted with thread compound prior to makeup.
12. PVC conduit shall not be run in walls except where approved by the Engineer prior to bid in limited instances that may include concrete or CMU walls used in site retaining, parking structures, or exterior equipment yard or enclosure walls, etc.
13. Where conductors enter a raceway or a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a

plastic bushing type fitting providing a smoothly rounded insulating surface.

14. Where conduit extends through roof to equipment on roof area, the Contractor shall provide flashing material compatible with the roofing system as required by the roofing specifications or as required by the Owner's roof warranty. This flashing shall be delivered to the roofing Contractor for installation. The actual location of all such roof penetrations and outlets shall be verified by the Architect/Owner. Contractor to verify type of flashing prior to bid and include all costs.
15. All conduit shall be supported at intervals not less than 6'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two-hole conduit clamp properly secured.
16. Where conduit racks are used the rack shall consist of two-piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.
17. Nail-in conduit supports, one-piece set screw type conduit clamps or perforated iron for supporting conduit shall not be used.
18. Seismic Conduit Support:
 - a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

| <u>CONDUIT SIZE</u> | <u>MAXIMUM SPACING</u> |
|---------------------|------------------------|
| 1/2" to 3" | 6'-0" |
| 3-1/2" to 4" | 8'-0" |
19. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.
20. Open knockouts in outlet boxes only where required for inserting conduit.
21. Locate wall outlet of the same type at same level in all rooms, except where otherwise noted.

22. Outlet boxes on metal studs shall be attached to metal hangers, tack welded or screwed to studs; on wood studs attachment shall be with wood screws, nails are not acceptable.
23. Recessed boxes shall not be mounted back-to-back in any wall; minimum offset shall be 24 inches.
24. Junction Boxes that do not contain any device(s) shall be located in storage rooms, electrical closets, or above accessible ceilings, not in hard lid ceilings or other forms of inaccessible ceilings. Place boxes which must be exposed to public view in a location approved by the Owner's Project Manager. Provide covers or plates to match adjacent surfaces as approved by the Owner's Project manager.
25. Surface mounted pull boxes, terminal cabinets, junction boxes, panel boards etc., shall be attached to walls using appropriate screws, fasteners, backing plates, stud blocking etc., as detailed on architectural and/or structural drawings. If architectural and/or structural drawings are not provided on the project, Contractor shall provide all necessary mounting hardware and backing support to comply with local building code requirements and any additional requirements imposed by the local Authority-Having-Jurisdiction.
26. Sleeves shall be installed where conduit passes through masonry or concrete walls and shall be 24-gauge galvanized steel no more than 1/2" greater in diameter than the outside diameter of the conduit. When located in non-rated structures, caulk conduit sleeve with stone wool and waterproof below grade. When located in fire rated structures, provide UL listed fire stopping system. See fire stopping section of this specification for additional requirements.
27. All boxes shall be covered with outlet box protector, Appleton SB-CK, or similar device/method to keep dirt/debris from entering box, conduit or panels. If dirt/debris does get in, it shall be removed prior to pulling wires.
28. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover, and painted as directed by the Architect with weatherproof paint to match building.
29. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.
30. Provide nylon or a 1/8-inch O.D. polyethylene rope, rated at 250 pounds tensile strength, in all conduits more than 5 feet in length left empty for

future use. Not less than 5 feet of rope shall be left at each end of the conduit. Tag all lines with a plastic tag at each end indicating the termination/stub location of the opposite end of the conduit.

31. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/racks, Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system. Support conduit to structure above suspended ceilings 8" minimum above ceiling to allow removal of ceiling tile. Maintain two-inch clearance above recessed light fixtures
32. All exposed conduits and support hardware shall be painted to match the finish of the wall or ceiling to which it is supported.
33. Where conduits or wireways cross seismic joints, provide approved flexible conduit connection or approved expansion/deflection fitting to allow for displacement of conduit in all three axes. Connection shall allow for movement in accordance with design of seismic joint. Non-flexible raceways crossing expansion joints or other areas of possible structural movement shall make provision for 3-way movement at such points by means of expansion/deflection fittings. Fittings shall be installed in the center of their axes of movement and shall not be deflected to make part of a conduit bend, or compressed or extended to compensate for incorrect conduit expansion/deflection fittings(s) complete with ground jumpers. Where necessary, provide approved expansion joints to allow for thermal expansion and contraction of conduit(s). Install expansion joints complete with ground jumpers.
34. Seal all conduits where termination is subject to moisture or where conduit penetrates exterior wall, floor or roof, in refrigerated areas, classified (hazardous areas) and as indicated on the drawings.
35. Except as otherwise indicated on the Drawings or elsewhere in these specifications, bends in feeder and branch circuit conduit 2 inches or larger shall have a radius or curvature of the inner edge, equal to not less than ten (10) times the internal diameter of the conduit. Except where sweeping vertically into a building, and where sweep radius equals ten (10) times conduit diameter, underground communications and building interconnect conduits 3 inches or larger shall have a minimum 12'-6" radius or curvature of the inner edge. For the serving utilities, radius bends shall be made per their respective specifications.
36. Tag all empty conduits at each accessible end with a permanent tag identifying the purpose of the conduit, footage end-to-end, and the

location of the other end. In wet, corrosive outdoor or underground locations, use brass, bronze, or copper 16-gauge tags secured to conduit ends with #16 or larger galvanized wire. Inscribe on the tags, with steel punch dies, clear and complete identifying information.

37. The following additional requirements shall apply to underground conduits:

- a. Include a separate insulated green ground conductor sized per CEC in each underground electrical feeder/branch circuit.
- b. All underground conduits with circuits rated at 40As or greater and all underground communications conduits shall be provided with a metallic marker tape located 12 inches below the finished grade.
- c. Where underground conduits sweep into/through slabs, utilize PVC 90 degree sweeps that transition, via female PVC adapter to GRC coupling mounted flush in slab. GRC couplings shall be 1/2 lap taped with 20-mil tape. If the distance of the conduit run between a sweep and the next connecting sweep, pullbox, vault or manhole exceeds 150 ft then the sweep shall be concrete encased. Exceptions:
 - 1) Communications conduits shown terminating at a finished floor shall have an additional 4" high GRC nipple equipped with a bushing, removable conduit plug, labeling tag and pull rope. Tie off pull rope to conduit plug.
 - 2) Utility conduit sweeps shall be installed per the requirements of the respective utility company.
- d. All PVC conduit shall be glued for a water and gas tight installation. The Contractor shall use appropriate solvent on all joints prior to gluing conduit and fittings together.
- e. All underground conduit work shall conform to the Federal, State and Local Safety Orders or Rules regarding excavations, trenches and related earthwork. For projects in California, refer to the California Code of Regulations, Title 8, Construction Code Sections 1540 and 1541 for additional requirements.

B. Installation of 600-Volt Conductors:

1. All electrical wire, including signal circuits, shall be installed in conduit.

2. All circuits and feeder wires for all systems shall be continuous from over current protective device or switch to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.
 - a. Utilize preinsulated "winged" spring type connectors, 3M Company "Performance Plus" #O/B or #R/Y or equal as required for splices and taps in conductors #6 AWG and smaller. When a spring connector is used in an underground environment or when subject to moisture, utilize a 3M Company Scotchcast 3507G epoxy resin connector sealing pack to seal the spring connector. **THE USE OF PUSH-WIRE CONNECTORS (e.g. "WAGO" OR EQUIVALENT) IS STRICTLY PROHIBITED.**
 - b. Wires #4 AWG and larger AWG shall be joined together as follows:
 - 1) When located in an underground environment or when subject to moisture, the splice shall be made with compression connector and sealed by a 3M, or equal, PST cold shrink connector insulator.
 - 2) When located in an interior environment, the splice shall be made with an llSCO or equal dual rated, insulated splice-reducer connector or multi-tap connector-listed for use with 75/90-degree Celsius rated conductors.
 - c. Connections to busbar shall be made with dual-rated copper/aluminum one-piece compression lugs. Paralleled conductor connections shall be by mechanical lugs.
3. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires.
4. Install UL approved fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.
5. For 20A branch circuit wiring, increase #12 conductors to #10 for 120-volt circuits longer than 100 feet and for 277V circuits longer than 150 feet.
6. Conductor Support: Provide conductor supports as required by codes and recommended by cable manufacturer. Where required, provide cable supports in vertical conduits and provide lower end of conduit with a ventilator.

C. Grounding/Bonding:

1. Provide grounding and bonding for entire electric installation as shown on plans, as listed herein, and as required by applicable codes. Included, but not limited to, are items that require grounding/bonding:
 - a. Conduit, Raceways and Cable Trays.
 - b. Neutral or identified conductors of interior wiring system.
 - c. Panel boards, Distribution Boards, Switchgear and Switchboards.
 - d. Non-current carrying metal parts of fixed equipment.
 - e. Metal piping installed in or attached to a building/structure.
2. Use of Ground Rods: Furnish and install required number of 3/4" x 10' copper clad ground rods to meet specified resistance, all required grounding wires, conduit and clamps. The size of the grounding conductors shall be not less than that set forth in the latest edition of the California Code of Regulations, Title 24, State of California and CEC, unless otherwise indicated. Rods shall be installed such that at least 10 feet of length is in contact with the soil. Where rock bottom is encountered, the electrode shall be driven at an oblique angle not to exceed 45 degrees from vertical or shall be buried in a trench that is at least 30 inches deep. The upper end of the electrode shall be flush with or below ground level unless the above ground end and the grounding electrode conductor attachments are protected against physical damage. Unless otherwise noted, connection to the grounding electrode conductor may be by compression type or exothermic process connector. Mechanical connectors shall not be used.
3. Grounding System Connection:
 - a. Compression connectors shall be unluted copper, manufactured by Burndy, or approved equal, designed specifically for the intended connection.
 - b. Exothermic weld-type connectors shall be 'Cadweld' manufactured by Erico Products, or approved equal, designed specifically for the intended connection.
 - c. Mechanical connectors shall not be used.
4. Provide separate green equipment ground conductor in all electrical raceways to effectively ground all fixtures, panels, controls, motors, disconnect switches, exterior lighting standards, and noncurrent carrying

metallic enclosures. Use bonding jumpers, grounding bushings, lugs, busses, etc., for this purpose. Connect the equipment ground to the building system ground. Use the same size equipment ground conductors as phase conductors, up through #10 AWG. Use CEC Table 250.122 for conductor size with phase conductors #8 and larger, if not shown on the Drawings.

5. Clean the contact surfaces of all ground connections prior to making connections.
6. Motors: Connect the ground conductor to the conduit with an approved grounding bushing, and to the metal frame with a bolted solderless lug. Bolts, screws and washers shall be bronze or cadmium plated steel.
7. Building grounding system resistance to ground shall not exceed 25 ohms unless otherwise noted and should be confirmed by testing.

D. Line Voltage and Low Voltage Power Supplies to all Mechanical Equipment Including Plumbing, Heating and Air Conditioning Units:

1. An electric power supply, including conduit, any necessary junction and/or outlet boxes and conductors and connection shall be furnished and installed by the Contractor for each item or mechanical equipment.
2. Power supplies to individual items of equipment shall be terminated in a suitable outlet or junction box adjacent to the respective item of equipment, or a junction box provided by the manufacturer or the equipment and directed by the Mechanical Contractor. Allow sufficient lengths of conductor at each location to permit connection to the individual equipment without breaking the wire run.
3. The location of all conduit terminations to the equipment is approximate. The exact location of these conduit terminations shall be located and installed as directed by the Mechanical and Plumbing Contractor.
4. Provide power supplies to all plumbing and mechanical equipment, including but not limited to, equipment furnished and installed by Owner or Contractor such as heating and air conditioning equipment, pumps, boilers, auto valves, water coolers, trap primers etc. The installation shall produce a complete and operable system.
5. Unless otherwise noted, the Contractor shall furnish and install all conduit, boxes, wires, etc., for line voltage wiring and low voltage wiring.

6. It is the Contractor's responsibility to verify with the drawings of other trades regarding the extent of his responsibility for mechanical equipment. The bid must include a sum sufficient to cover the cost of the installation.
 7. The location of all power supply connection and/or terminations to the mechanical equipment is approximate. The exact locations of these terminations shall be verified with other trades during construction.
- E. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.
- F. Firestopping:
1. The Contractor shall be responsible for furnishing all material, labor, equipment, and services in conjunction with the selection and installation of a complete, fully functioning, code compliant, UL-listed, fire stop assembly/system(s) as required by project conditions.
 2. Each fire stop assembly/system shall have an "F" and/or "T" rating as required by each condition requiring fire stopping. Each fire stop assembly/system shall have a current UL listing, as indicated in the latest edition of the UL Fire Resistance Directory. Contractor shall verify acceptability of all fire stopping methods and system selections with the authority having jurisdiction prior to installation. The Contractor shall install each fire stop assembly/system in accordance with the manufacturer's printed instructions.
 3. Each fire stop assembly/system shall be labeled with fire stop manufacturer-furnished label on each side of the fire stopping systems depicting UL # etc.

END OF SECTION

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Protecting existing trees, shrubs, groundcovers, plants and grass to remain.
2. Removing existing trees, shrubs, groundcovers, plants and grass.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and either removing site utilities or abandoning site utilities in place.
7. Temporary erosion and sedimentation control measures.

1.2 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

- D. Do not commence site-clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

3.5 CLEARING AND GRUBBING

- A. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of eight inches and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 31 10 00

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
 - 1. Driveways and roadways.
 - 2. Parking lots.
 - 3. Curbs and gutters.
 - 4. Walkways.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, including admixtures.
- B. Design Mixtures: For each concrete pavement mixture.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- C. All work to be performed and materials to be used shall be in accordance with the Standard Specifications for Public Works Construction, latest edition and supplements.
- D. All finished surfaces shall be "slip-resistant" per requirements outlines in the Cal Trans Standard Specifications Section 40-1.10 Final Finishing.
- E. The Contractor shall have one copy of the Standard Specifications at the job site.
- F. The Standard Specifications apply only to performance and materials and how they are to be incorporated into the Work. The legal/contractual relationship sections and the measurement and pavement sections do not apply to this document.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.2 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland Cement: ASTM C 150, Type II, low alkali. Supplement with the following:
 - a. Pozzolan: ASTM C 618, Class F or N Fly Ash, 100 pounds maximum per cubic yard, containing one percent or less carbon. Fly ash shall not be used in excess of 15 percent by weight of total cement quantity.
- B. Combined Aggregates: Gradation "C" conforming to SSPWC Section 201-1.3.2.
- C. Water: ASTM C 94/C 94M.

2.3 CURING MATERIALS

- A. Liquid Curing Compound: ASTM C309, fugitive dye dissipating type, complying with Rule II 13 of the South Coast Air Quality Management District and Federal Air Quality Regulation 40 CFR 52.254.
- B. Moisture-Retaining Cover (Curing Sheet): ASTM C 171, non-staining polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

2.4 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- C. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- D. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with Caltrans Standard Specifications - Section 84 (Federal Specification No. TT-P-1952 for Blue, Red and Green paint; and State of California Standard Specification No. PTWB-01 for White, Yellow and Black paint) with drying time of less than 45 minutes.
 - 1. Color: Per Architect

2.5 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, Solid, integrally colored, 96 percent recycled HDPE or commingled postconsumer and postindustrial recycled plastic; UV stabilized.
 - 1. Dowels: Galvanized steel, three-fourths-inch diameter, 24-inch minimum length.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, with the following properties:
 - 1. Compressive Strength (28 Days): 2,500 pounds per square inch (psi)
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.60.
 - 3. Slump Limit: Four inches, plus or minus one inch.
- B. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates to Architect for each batch discharged and used in the Work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

- A. General: Form construction, isolation, and control joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

- D. Control Joints: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of the concrete thickness.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a one-fourth-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
- B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- D. Screed pavement surfaces with a straightedge and strike off.
- E. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. General: Slopes less than 6% shall have equal or better than medium salted finish. Slopes greater than 6% shall be slop resistant.
- C. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
 - 2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface one-sixteenth to one-eighth inch deep with a stiff-bristled broom, perpendicular to line of traffic.
- D. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on pavement surface according to manufacturer's written instructions.
 1. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.
 2. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose nonslip aggregate.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 pounds/square feet x h before and during finishing operations. Apply according to manufacturers written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these methods.

3.8 PAVEMENT TOLERANCES

- A. Comply with tolerances as follows
 1. Elevation: One-fourth inch.
 2. Thickness: Plus three-eighths inch minus one-fourth inch.
 3. Surface: Gap below 10-foot long, unlevelled straightedge not to exceed one-fourth inch.
 4. Joint Spacing: Three inches.
 5. Contraction Joint Depth: Plus one-fourth inch no minus.
 6. Joint Width: Plus one-eighth inch, no minus.

3.9 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.10 WHEEL STOPS

- A. Securely attach wheel stops into pavement with not less than two galvanized steel dowels embedded in holes drilled or cast into wheel stops at one-quarter to one-third points. Firmly bond each dowel to wheel stop and to pavement. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel one inch beneath top of wheel stop.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.
- C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

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