PROJECT MANUAL
INCLUDING SPECIFICATIONS

FOR

Wiseburn DaVinci H.S. CTE Studio and Shop

201 N. Douglas
El Segundo, CA 90245

File #:19-H70
DSA A# 03-122491

ARCHITECT

SVA ARCHITECTS
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SVA Project Number: 2021-40174

08-08-2022

WISEBURN DAVINCI HS CTE PROJECT
EL SEGUNDO, CALIFORNIA

08/08/2022

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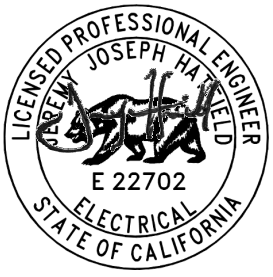

Michael Stewart **1997**
Fire Protection EOR

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-122491 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/27/2022

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SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Project consists of construction of a 4,200 s.f. building for use as a vocational CTE studio and a 2,000 s.f. DSA PC shade canopy. Associated site preparation and improvements including utilities, fencing, and paving.

1. Owner reserves right to remove and retain possession of existing items prior to start of Contract.

2. Removal of hazardous material shall be per separately provided hazardous material abatement report prepared by others. Architect shall not be involved in determination, removal or disposal of hazardous materials.

1.2 REQUIREMENTS INCLUDED

A. This section includes administrative provisions:

1. Work sequence.
2. Contractors use of premises.
3. Field engineering.
4. Regulatory requirements and reference standards.
5. Owner furnished Contractor installed products (OFCI).
6. Owner pre-ordered products.

1.3 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner and Architect.

B. Perform construction in phases as indicated.

1.4 CONTRACTORS USE OF PREMISES

A. Limit use of premises for Work and construction operations and to allow for work by other contractors.

B. Coordinate use of premises and access to site under direction of Owner and Architect.

1.5 FIELD ENGINEERING

A. Provide field engineering services; establish lines and levels by use of recognized engineering survey practices.

B. Locate and protect control and reference points.

1.6 REGULATORY REQUIREMENTS AND REFERENCE STANDARDS

A. Regulatory Requirements:

1. Architect has contacted governing authorities and reviewed design requirements of local, state and federal agencies for applicability to Project.

2. Contractor shall be responsible for contacting governing authorities directly for necessary information and decisions bearing upon performance of Work.

B. Reference Standards:

1. For Products specified by association or trade standards, comply with requirements of referenced standard, except when more rigid requirements are specified or are required by applicable codes.

2. Applicable date of each standard is that in effect as of date on proposal or date on Contract where no proposal is available, except when a specific date is specified.

1.7 OWNER FURNISHED CONTRACTOR INSTALLED PRODUCTS (OFCI

A. Select products are to be furnished and paid for by Owner and installed by Contractor:

1. Refer to Drawings and Specifications.

B. Owner's Responsibilities:

1. Arrange for and deliver shop drawings, product data, and samples to Contractor.
2. Arrange and pay for product delivery to site.
3. Inspect products jointly with Contractor on delivery.
4. Submit claims for transportation damage.
5. Arrange for replacement of damaged, defective, or missing items.
6. Arrange for manufacturer's warranties, inspections, and service.

C. Contractor's Responsibilities:

1. Review shop drawings, product data, and samples.
2. Receive and unload products at site.
3. Inspect jointly with Owner for completeness and damage.
4. Handle, store, and install products.
5. Finish products as required after installation.
6. Repair or replace items damaged by Work of this Contract.

1.8 OWNER PRE-ORDERED PRODUCTS

A. Select products have been pre-ordered by Owner:

1. Refer to Drawings.

B. Owner has negotiated purchase orders for these products for incorporation into Project.

1. Purchase orders are assigned to Contractor; costs shall be included into base bid.

2. Contractor's responsibilities are same as if Contractor negotiated purchase orders.

END OF SECTION

SECTION 01 20 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Special administrative and procedural requirements necessary to prepare and process Application for Payment.

1.2 SCHEDULE OF VALUE

A. Coordination: Coordinate preparation of Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in Schedule of Values with other required administrative forms and schedules, including application for Payment forms with Continuation Sheets, Submittals Schedule, and Contractor's Construction Schedule.

2. Submit Schedule of Values to Architect at earliest possible date but no later than seven days before date scheduled for submittal of initial Application for Payment.

B. Format and Content: Use Project Manual table of contents as guide to establish line items for Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include following Project identification on Schedule of Values.

a. Project name and location.
b. Name of Architect.
c. Architect's Project number.
d. Contractor's name and address.
e. Date of submittal.

2. Submit draft of AIA Document G703 Continuation Sheets.

3. Provide breakdown of Contract Sum in enough detail to facilitate continued evaluation of Application for Payment and progress reports. Coordinate with Project Manual table of contents.

a. Provide several line items for principal subcontract amounts where appropriate.

4. Round amounts to nearest whole dollar; total shall equal Contract Sum.

5. Provide separate line item in Schedule of Values for each part of Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

6. Provide separate line items in Schedule of Value for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of Work.

7. Each item in Schedule of Values and Application for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in Schedule of Values or distributed as general overhead expense at Contractor's option.

8. Schedule Updating: Update and resubmit Schedule of Values before next application for Payment when Change Orders or Construction Change Directives result in a change in Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

    1. Initial Application for Payment: Application for Payment at time of Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Date for each progress payment is indicated in Agreement between Owner and Contractor. Period of construction Work covered by each Application for Payment is period indicated in Agreement.

C. Payment Application Forms: AIA Document G702 and AIA Document G703 Continuation Sheets as form for Application for Payment.

D. Application Preparation: Complete every entry on form. Execute by person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

    1. Entries shall match data on Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

    2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal:

    1. Contractor shall provide ten copies of Application for Payment one week prior to Payment Request ("Draw") Meeting, for review of team members.

    2. Contractor shall provide ten wet signed copies of Application for Payment at Payment Request ("Draw") Meeting.

        a. Provide each copy with transmittal form listing attachments and recording appropriate information about application.

        b. Copies shall include waivers of lien and similar attachments if required.

F. Waivers of Mechanic's Lien: With each Application for Payment submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of Contract and related to Work covered by payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit final or full waivers.

3. Owner reserves right to designate which entities involved in Work must submit waivers.

4. Waiver Forms: Submit waivers of lien on forms executed in manner acceptable to Owner.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following.

1. List of subcontractors.

2. Schedule of Values.

3. Contractor's Construction Schedule (preliminary if not final).

4. Schedule of unit prices.

5. Submittals Schedule (preliminary if not final).

6. List of Contractor's staff assignments.

7. List of Contractor's principal consultants.

8. Copies of building permits.

9. Copies of authorizations and licenses from authorities having jurisdiction for performance of Work.

10. Initial progress report.

11. Report of preconstruction conference.

12. Certificates of insurance and insurance policies.

H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted including but not necessarily limited to following.

1. Evidence of completion of Project closeout requirements.

2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

3. Updated final statement accounting for final changes to Contract Sum.

4. AIA Document G706, Contractor's Affidavit of Payment of Debts and Claims.

5. AIA Document G706A, Contractor's Affidavit of Release of Liens.

6. AIA Document G707, Consent of Surety to Final Payment.

7. Evidence that claims have been settled.

8. Final meter readings for utilities, a measured record of stored fuel, and simliar data as of date of Completion.

9. Final liquidated damages settlement statement.

USE FOLLOWING FOR LEED CERTIFIED PROJECTS.

10. LEED Final Reports: Submit complete set of LEED Reports as required for submittal to USGBC and as specified in Section 01 35 10.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes a description of alternate work.

B. Related Requirements:

1. Pricing Documents: Quotation of cost of each alternate.

2. Owner-Contractor Agreement: Alternates accepted by Owner for incorporation into the Work.

3. Sections of Specifications identified in each Alternate.

1.2 PROCEDURES

A. Alternates will be exercised at Owner's option.

B. Coordinate Related Work: and modify surrounding work as required to complete Work, including changes under each alternate, when acceptance is designated in Owner-Contractor Agreement.

1.3 ALTERNATES

A. Alternates:

B. Alternate No. 1: To Be Determined

1. Work Included in Alternate: Include deduct cost for each line item requiring custom color where color is not indicated on Drawings or Finish Schedule.

2. Work Included in Contract Amount: Include custom color as directed by Architect where color is not indicated on Drawings or Finish Schedule.

3. Sections: List each Technical Section in Project Manual that indicates custom color where color is not indicated on Drawings or Finish Schedule. List to indicate amount in dollars to be saved if Architect selects manufacturer’s standard color.

C. Alternate No. 2:

1. Work Included in Alternate: To Be Determined

2. Work Included in Contract Price:

3. Refer to Section

4. Refer to Drawing No.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. General: Procedures are described for requesting substitution of unlisted materials in lieu of materials named in Specifications or approved for use in addenda.

1. Provide products listed in Contract Documents, products by manufacturers listed in Contract Documents, and products meeting specified requirements.

a. Contract Amount: Base on materials and products included in Contract Documents.

b. Where materials and products are listed in Contract Documents, materials and products by manufacturers not listed shall not be used without Owner’s and Architect’s approval of Contractor's written request for substitution.

2. Purpose: After bidding, substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to no fault of Contractor.

3. Purpose: Substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to conditions beyond Contractor control.

a. Owner benefits either from a Contractor proposed reduction of the Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.

b. List proposed cost or time reductions on request for substitution.

c. Requests not including a proposed cost or time reduction will not be considered unless Contractor submits supporting information indicating specified materials are not available.

B. Related Sections:

1. Section 01 60 00: Product requirements.

1.2 SUBSTITUTIONS

A. Within a period of 35 days after award of Contract, Owner and Architect will consider formal requests for substitutions only from Contractor as specified in 1.1 Summary.

1. Owner and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.

2. After initial 35-day period, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.

B. Prior to submittal of second Request for Payment Owner and Architect will consider formal requests for substitutions from Contractor as specified in 1.1 Summary.

1. Owner and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.

2. After payments begin, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.

C. Submit each request with sequentially numbered “Substitution Request Transmittal” acceptable to Owner and Architect; submit separate request for each product and support each request with:

1. Product identification with manufacturer's literature and samples where applicable.

2. Name and address of similar projects on which product has been used, and date of installation.

D. Submit itemized comparison of proposed substitution with product specified and list significant variations.

E. Submit data relating to changes in construction schedule.

F. Note effect of substitution on other work, products, or separate contracts.

1. Note if acceptance of substitution could require revision of Contract Documents, Drawings, details or Specifications.

G. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price.

1. Include costs to other contractors and costs for revisions to Drawings, details or Specifications.

H. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on submittals without a formal request from Contractor.

2. They are requested directly by a subcontractor or supplier.

3. Acceptance will require substantial revision of Contract Documents.

I. Substitute products shall not be ordered without written acceptance of Owner and Architect.

J. Owner and Architect will determine acceptability of proposed substitutions and reserves right to reject proposals due to insufficient information.

1.3 CONTRACTOR'S REPRESENTATION

A. Requests constitute a representation that Contractor:

1. Has investigated proposed product and determined it meets or exceeds, in all respects, specified product.

2. Will provide same warranty or longer warranty for substitution as for specified product.

3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.

4. Waives claims for additional costs that subsequently become apparent.

5. Will pay costs of changes to Contract Documents, Drawings, details and Specifications required by accepted substitutions.

1.4 ARCHITECT'S DUTIES

A. Review Contractor's requests for substitutions with reasonable promptness.

1. Architect will recommend that Owner accept or reject substitution request.

2. Upon request, Architect will provide cost for changes to Contract Documents, Drawings, details and Specifications required for substitutions.

B. Notify Contractor in writing of decision to accept or reject requested substitution.

CONTRACTOR'S SUBSTITUTION REQUEST

(Use separate form for each request)

Date: _____ Request No.: _____

TO: Architect _____
Phone: _____ Fax: _____

PROJECT: _____ Project No.: _____
CONTRACTOR _____

SPECIFIED ITEM: _____
Section: _____ Page: _____ Paragraph: _____ Description: _____
Drawing Number(s): _____ Detail Number(s): _____
The undersigned request consideration of the following:
PROPOSED SUBSTITUTION: _____

REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS: _____

SAVINGS or CREDIT to OWNER for ACCEPTING SUBSTITUTE: $ _____
PROJECT COMPLETION CHANGE for ACCEPTING SUBSTITUTE Days _____

Attached data includes description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:

1. Proposed substitution has been fully checked and coordinated with the Contract Documents.
2. The proposed substitution does not affect dimensions shown on Drawings.
3. The proposed substitution does not require revisions to mechanical or electrical work.
4. The undersigned will pay for changes to the building design, including architectural and engineering design, detailing, and construction costs caused by the requested substitution.
5. The proposed substitution will have no adverse effect on other trades, construction schedule, or warranty.
6. Maintenance and service parts will be locally available for the proposed substitution.
7. The proposed substitution will have no adverse effect on LEED credits (applies to LEED Projects ONLY)
8. The proposed substitution will have no adverse effect on Green Building Requirements where applicable.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Attachments: The attached data is furnished herewith for evaluation of the proposed substitution.
☐ Catalog ☐ Drawings ☐ Samples ☐ Reports ☐ Tests ☐ Other: _____
Submitted by:

_____ _____
(Firm) (Authorized Legal Signature)

_____ ( )
(Address) (Telephone)

For use by the Architect: ☐ Accepted ☐ Accepted as Noted ☐ Rejected: Submit Specified Item
BY: _____
(Authorized Signature)

Date: _____ Remarks: _____

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This section specifies administrative and procedural requirements governing Contract modification procedures.

1. Requests for Information (RFI).
2. Change Order.
3. Allowances.
4. Construction Change Directive.

B. Related Requirements:

1. Section 01 25 00: Substitution procedures.
2. Section 01 30 00: Administrative requirements.

1.2 MINOR CHANGES IN WORK

A. Architect will issue supplemental instructions authorizing minor changes in Work, not involving adjustment to Contract Sum or Contract Time, on AIA Form G710, Architect’s Supplemental Instructions or similar form.

1.3 REQUESTS FOR INFORMATION

A. Contractor may submit a written Request for Information (RFI) in format approved by Architect relating to perceived inconsistencies and omissions in Contract Documents.

1. A record of RFI's is to be maintained by Contractor along with information regarding origin of request, date of request, and date request was received from Architect. Number RFI's sequentially based on date of request.

B. Requests for Information shall be used only as a means of obtaining clarification of information not included in Contract Documents and shall not be used to assist Contractor in preparation of shop drawings or other information required by Contract.

1. Contract Documents are intended to contain enough information to show aesthetic and design intent and to provide information such that construction procedures (means and methods) may be reasonably inferred.

2. Contract Documents are not intended to provide specific information related to means and methods of construction nor are they intended to be exhaustive in content.

C. Contractor shall carefully review requests for information by subcontractors and suppliers to ascertain if information is in Contract Documents prior to submitting a Request for Information to Architect based on requests by others.

1. Contractor may suggest possible solutions to fit Project conditions where appropriate.

D. Architect reserves right to return RFI's that do not reasonably relate to necessary clarification of intent of Contract Documents and to charge Contractor for time and materials involved in answering RFI's where information is in Contract Documents.

1. RFI's shall not be used as a request for substitutions; refer to Section 01 25 00 – Substitution Procedures.

1.4 CHANGE ORDERS

A. Owner-Initiated Proposal Requests: Architect will issue detailed description of proposed changes in Work that require adjustment to Contract Sum or Contract Time. If necessary, description will include supplemental or revised Drawings and Specifications.

1. Proposal requests issued by Architect are for information only. Do not consider changer order proposal requests as instruction either to stop work in progress or to execute proposed change.

2. Within 10 days of receipt of a proposal request, submit estimate of cost necessary to execute change to Architect for Owner's review.

a. Include list of quantities of products required and unit costs, with total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental and amounts of trade discounts.

c. Include a statement indicating effect of proposed change in Work will have on Contract Time.

B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to Contract, Contractor may propose changes by submitting a request for a change to Architect and Owner.

1. Include statement of reasons for change and effect of change on Work. Provide a complete description of proposed change. Indicate effect of proposed change on Contract Sum and Contract Time.

2. Include a list of quantities of products required and unit costs with total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental and amounts of trade discounts.

4. Comply with requirements in Section 01 25 00 - Substitution Procedures if proposed change requires substitution of unspecified product or system for specified product or system.

C. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests; other substitute formats shall be submitted to Owner and Architect for approval prior to use.

D. Change Order Procedures: Contractor shall be directed to proceed with Work upon Owner's approval of Proposal.

1. Architect will issue Change Order for signatures of Owner and Contractor on AIA Form G701 or similar form, including approved Change Order proposals for that time period.

2. Amounts of each Change Order shall be indicated in each Request for Payment including payment status for each individual Change Order.

1.5 ALLOWANCES

A. Allowance Adjustment: For Contract items bid based on allowance, submit Change Order Proposal on difference between actual purchase amount and allowance, based on work-in-place.

1. Include installation cost in purchase amount only where indicated as part of allowance.

2. When requested, prepare explanations and documentation to substantiate amounts claimed for work done based on allowances.

3. Submit substantiation of a change in Scope of work claimed in Change Orders related to allowances.

4. Owner reserves right to establish actual quantity of work-in-place by independent quantity survey, measure or count.

B. Submit claims for increase costs because of a change in scope or nature of allowance described in Contract Documents, whether for purchase order amount or Contractor's handling, labor, installation, overhead and profit.

1. Submit claims within 21 days of receipt of Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 21 days.

2. Do not include Contractor's or subcontractor's indirect expense in Change Order cost amount unless it is clearly shown that nature or extent of work has changed from what could have been foreseen from information in Contract Documents.

3. No change to Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of same scope and nature as originally indicated.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When Owner and Contractor disagree on terms of Proposal Request, Architect may issue a Construction Change Directive per AIA Form G714 or similar form.

1. Construction Change Directive instructs Contractor to proceed with change in Work, for subsequent inclusion in Change Order.

2. Construction Change Directive contains a complete description of change in Work. It also designates method to be followed to determine change in Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of Work required by Construction Change Directive. Coordinate scheduling with Construction Manager to allow monitoring by Owner if desired.

1. After completion of change, submit itemized account and supporting data necessary to substantiate cost and time adjustments to Contract.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general procedural requirements for ongoing submittals.

1. Schedule of values.
2. Product data and manufacturer’s literature.
3. Shop drawings.
4. Samples.
5. Manufacturers' certificates.
6. Excess materials and attic stock.
7. Design build (delegated design) procedures.
8. Deferred approval requirements.

B. Related Requirements:

1. Section 01 31 00: Project management and coordination.
2. Section 01 32 00: Construction Schedule – Network Analysis.
3. Section 01 40 00: Test reports, manufacturer's field reports, and mock-ups.
4. Section 01 70 00: Manufacturers’ instructions.
5. Section 01 77 00: Closeout requirements including Project Record Documents.
6. Section 01 78 00: Warranties.

1.2 GENERAL SUBMITTAL PROCEDURES

A. Submittals: Transmit each item using form approved by Architect; submit sample to Architect for approval prior to use.

1. Identify Project, Contractor, subcontractor, major supplier.

a. Attach sequential identification number for each new submittal.

b. Identify each resubmittal using original submittal number and sequential identification clearly indicating item is resubmitted.

2. Identify pertinent Drawing sheet and detail number, and Specification section number as appropriate.

3. Identify deviations from Contract Documents.

4. Provide space for Contractor and Architect review stamps.

5. Contractor: Review and stamp submittals from subcontractors prior to submitting to Architect.

a. Review submittals and indicate where conflicts occur with Contract Documents and with work of other subcontractors.

b. Return submittals that vary significantly from Contract Documents for correction and resubmittal prior to submitting to Architect.

c. Submittals that vary significantly from Contract Documents and that fail to indicate thorough Contractor review prior to submission to Architect will be returned without review.

d. Cursory review and stamping of subcontractor submittal by Contractor shall not be acceptable.

B. Initial Schedules: Submit initial progress schedule and schedule of value in duplicate within 15 working days after award of Contract.

1. After review by Owner and Architect revise and resubmit where required.

C. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.

D. After Architect review of submittal, revise and resubmit as required, identify changes made since previous submittal.

E. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply.

1.3 TYPES OF SUBMITTALS

A. General: Project requires various types of submittals to maintain communications, minimize misunderstandings, avoid unnecessary conflicts, and to ensure complete documentation for Project Record Documents.

1. Maintain complete set of submittals including required revisions.

B. Construction Schedules: Submit construction progress schedules for Design Team and Owner review and to maintain entire team up-to-date on construction activities.

C. Schedule of Values: Submit Schedule of Values indicating division of Work, subcontractors to perform work, products being used, and values attributed to each to inform Design Team and Owner.

D. Action Submittals: Submittals relating to product data and manufacturer’s literature, shop drawings, and samples for Design Team review and comment; do not begin fabrication, delivery, or installation until Design Team review is complete.

E. Information Submittals: Submittals relating to certifications, qualifications, reports, including test reports, and instructions are for information; Design Team may choose to comment but action is not generally anticipated.

1. Manufacturer installation instructions and recommendations shall be considered information submittals.

F. Design/Build Submittals: Where portion of Work requires design by specialized professionals submit information necessary to ensure work complies with Contract Documents along with certifications signed by qualified professional.

1. Calculations: Do not submit calculations unless specifically required by Contract Documents; submit calculations required by applicable authorities directly to applicable authorities;

a. Submit certification by qualified professional indicating required calculations have been prepared and work conforms to Contract Documents and applicable codes and regulations.

G. Maintenance Materials Submittals: Compile maintenance information and materials during Work to ensure complete set of documents, maintenance manuals, and operation instructions.

H. Closeout Submittals: Compile closeout submittals, organize, and submit to Owner prior to or at time of Substantial Completion. Project will not be considered Substantially Complete until closeout submittals have been received by Owner.

I. Material Safety Data Sheets (MSDS): MSDS will only be reviewed by Architect when submitted to show compliance with LEED certification requirements.

1. Non-LEED submittals that include material safety data sheets will be returned for resubmittal.

1.4 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703 or another Owner and Architect pre-approved 8-1/2" by 11" paper format; Contractor's standard media-driven printout will be considered on request. Submit within 15 days after award of Contract.

B. Format: Table of Contents of this Project Manual, with modifications as pre-approved by Owner and Architect; identify each line item with number and title of major Specification sections.

C. Include in each line item a directly proportional amount of Contractor overhead and profit.

D. Revise schedule to list change orders for each Application for Payment.

1. Submit subschedule for each phase of Work.

1.5 PRODUCT DATA/MANUFACTURERS' LITERATURE

A. Action Submittals: Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the Work.

B. Information Submittals: Include manufacturers' installation instructions only when required by Specifications or specifically requested by Architect.

1. Maintain copy of manufacturer installation instructions and recommendations in Contractor's field office for review.

C. Product data shall be submitted as electronic PDF files unless otherwise noted or approved by Architect in advance.

1. Where paper copies are permitted submit number of copies Contractor requires, plus one copy to be retained by Architect.

D. Submit number of copies Contractor requires, plus one copy to be retained by Architect.

1.6 SHOP DRAWINGS

A. Shop drawings shall be submitted as electronic PDF files unless otherwise noted or approved by Architect in advance.

1. Where prints are permitted submit one reproducible print; minimum sheet size 8-1/2” by 11”.

B. Shop drawings shall be submitted in reproducible format acceptable to Architect and Owner; computerized PDF files will be acceptable unless otherwise directed.

1. Prints: Submit one reproducible print; minimum sheet size 8-1/2” by 11”.

2. Prints: Submit three reproducible prints; minimum sheet size 8-1/2" by 11".

C. Distribution: After review, reproduce and distribute.

1.7 SAMPLES

A. Submit full range of manufacturers' standard colors, textures, and patterns for Architect's selection.

B. Submit samples to illustrate functional characteristics of Product, with integral parts and attachment devices.

C. Coordinate submittal of different categories for interfacing work.

D. Include identification on each sample, giving full information.

E. Submit number of samples required by Contractor plus one to be retained by Architect.

1. Maintain one set of approved samples at Project Field Office.

F. Sizes: Provide following sizes unless otherwise specified.

1. Flat or Sheet Products: Minimum 6" square, maximum 12" by 12".
2. Linear Products: Minimum 6", maximum 12" long.
3. Bulk Products: Minimum one pint, maximum one gallon.

G. Full size samples may be used in the Work upon approval.

1.8 MANUFACTURERS' CERTIFICATES

A. Submit certificates, in duplicate in accordance with requirements of each Specification section.

1.9 EXCESS MATERIALS AND ATTIC STOCK

A. Excess Materials: Excess materials shall be considered property of Owner; inform Owner of extent of excess materials and methods required for handling and storage; remove from site excess materials not required by Owner for maintenance stock.

B. Attic Stock: Owner may choose to obtain additional attic stock for maintenance purposes where excess materials are not considered adequate.

1. Owner may require as much as 5% extra materials for maintenance purposes. Exact amount of each material shall be determined by Owner based on following meeting and additional costs determined by Contractor.

a. Contractor shall be prepared to order up to 5% extra materials on items that may not be readily available in future such as custom colors, off-shore manufacture, anticipated life span under 5 years, and potential for damage.

1) Do not order extra attic stock until extent is determined and agreed to by Owner including which materials require extra stock and exactly how much those materials will cost including shipping and handling.

b. Excess Materials: Furnish excess materials only for materials that have a shelf-life of more than three years.

2. Meeting: Conduct meeting prior to beginning Work to discuss extent of materials Owner would like to receive at Project Closeout for attic stock for maintenance materials; where available include personnel from Owner’s maintenance crew.

a. Estimate amount of excess materials to be anticipated to be ordered in addition to materials for handling and storage and how those materials will be invoiced and identified regarding material and location in Project.

b. Determine area necessary for adequate storage, handling, and identifying excess materials and attic stock and discuss with Owner.

c. Submit information regarding equipment necessary for handling of excess materials and attic stock due to weight, size, and storage requirements.

d. Assist Owner in determining where on-site or off-site additional attic stock for maintenance purposes will be delivered and stored.

3. Additional Costs: After meeting submit to Owner detailed listing of additional costs for each material Owner may like to receive for attic stock and assist Owner in modifying listing to determine acceptable final costs.

a. Include unit prices for desired attic stock where excess materials are not adequate for Owner maintenance stock.

4. Substantial Completion: Submit Construction Bulletin at Substantial Completion indicating changes to Contract Amount for attic stock including unit price totals for materials where excess materials are not adequate.

5. Final Completion: Ensure attic stock has been received, identified, cataloged, and stored at locations agreed upon with Owner based on Change Order indicating amounts finally agreed to by Owner.

1.10 DESIGN/BUILD PROCEDURES

A. Design as Part of Means and Methods of Construction: Select Project components require construction team design as part of means and methods of construction as described in various sections.

1. Terms commonly used such as Design/Build, Delegated Design, and Design/Assist are applicable to these procedures as determined by law but shall be generally referred to in these documents as Design/Build.

a. In general Design/Build includes design by licensed professionals with expertise beyond that allowed under standard architectural licensure, and outside of scope of work of other design professionals on the design team.

2. Contractor may be required to provide design services as part of construction for specific work defined as design or design-build where special expertise is required that is not available in the Project design team.

3. Subcontractors, fabricators, and manufacturers may be required to provide design services as part of their work due to special expertise in design services for their specific components, refer to technical sections for Design/Build.

4. Contractor, subcontractors, fabricators, manufacturers, and suppliers shall be responsible for attachments, anchors, fasteners, adhesives, and connectors suitable to applications unless specific items are listed in Contract Documents.

a. Where specific items are listed in Contract Documents Contractor, subcontractors, fabricators, manufacturers, and suppliers shall review and submit comments where items listed are not acceptable.

b. Where no comments are received, listed items shall be considered acceptable.

B. Contractor acknowledges and accepts responsibility for specialty design as part of means and methods of construction, as well as coordination of parties involved to achieve architectural design intent indicated in Contract Documents.

1. Design-build work includes sizing, sequencing, and detailing for construction by professional licensed or registered engineer or design professional with special expertise applicable to portion of Work involved.

2. Design-build work shall be constructed in compliance with building codes and regulations in effect and shall be fit and proper for intended use.

3. Design-build work shall include drawings, specifications, and calculations prepared, stamped, and signed by qualified professional licensed or registered engineer licensed in the Project location as appropriate to design-build work.

    a. Plans, specifications, and calculations shall be acceptable to Owner, Owner's Representative, and applicable authorities.

C. Where required by Owner Contractor shall submit copies of current insurance policies covering errors and omissions of persons designing design-build work with deductibles and limits per occurrence as mutually agreed by Owner and Contractor.

1. Provide endorsement to insurance providing for 30-day notice to Owner prior to cancellation or material reduction in coverage.

2. Insurance shall be maintained for not less than applicable statute of limitations for claims of latent defects, if such insurance is not written on an occurrence basis during time design-build work is designed and constructed.

D. Review proposed layouts with Design Team and with various trades prior to commencing work related to design-build work.

1.11 DEFERRED APPROVAL REQUIREMENTS

A. Installation of deferred approval items shall not be started until detailed plans, specifications, and engineering calculations have been accepted and signed by Architect or Engineer of Record responsible for Project design.

B. Deferred Approval Items shall be signed by California registered architect or professional engineer delegated responsibility covering specific work shown requiring approval by Division of the State Architect.

1. Deferred approval items for this Project include but may not be limited to following:

    a. Translucent Walls and Roofs – Section 08 45 00.

    b. Telescopic Bleachers – Section 12 66 01.

    c. Grandstands – Section 13 34 16.

    d. Hydraulic Elevators – Section 14 24 00.

2. Deferred approval drawings and specifications become part of the approved submittal documents for the Project when they are submitted to and approved by Division of the State Architect.

3. Submit four prints of each drawing. Drawings shall include empty 7" by 9" space on first sheet reserved for Architect to add "General Conformance Block" required for DSA.

4. Submit four copies of calculations, product data and test reports.

5. Identify and specify supports, fasteners, spacing, penetrations, etc., for each

deferred approval items, including calculations for each fastener.

6. Submit documents to Architect of Record for review.

7. Deferred submittal documents shall bear stamp and signature of architect or engineer licensed in State of California and responsible for work shown on deferred submittal documents.

8. Architect of Record will forward submittal to appropriate Project Engineer.

9. Review of Project Architect or Engineer of Record is for conformance with design concept shown on Contract Documents. Neither Architect or Engineer of Project shall be responsible for review for correctness of deferred approval items.

10. After review by Architect/Engineer of Record, Architect of Record will forward two copies of submittal to Division of the State Architect for approval.

11. Respond to review comments made by Division of the State Architect and revise and resubmit submittal for final approval.

12. Architect of Record will forward two copies of final revised submittal to the Division of the State Architect for approval.

13. The Division of the State Architect will return one copy of final submittal to the Architect of Record.

14. Architect of Record will forward one copy of evidence of submittal approval by Division of the State Architect for final distribution by General Contractor.

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Description of Project management and coordination including but not necessarily limited to the following:

1. General Project coordination procedures.
2. Coordination drawings.
3. Staff names.
4. Administrative and supervisory personnel.
5. Project meetings.

B. Related Sections:

1. Section 01 30 00: Administrative requirements.
2. Section 01 79 00: Demonstration and training.

1.2 COORDINATION

A. Coordination: Coordinate construction operations included in various Specifications sections to ensure efficient and orderly installation of each part of Work.

1. Coordinate construction operations that depend on each other for proper installation, connection, and operation.

2. Coordinate work to assure efficient and orderly sequence of installation of construction elements.

3. Make provisions for accommodating items installed by Owner or under separate contracts.

B. Prepare memoranda for distribution to each party involved as needed, outlining special procedures required for coordination.

1. Include required notices, reports, and list of attendees at meetings; include Architect and Owner in distribution.

C. Verify characteristics of interrelated operating equipment are compatible; coordinate work having interdependent responsibilities for installing, connection to, and placing such equipment in service.

D. Coordinate space requirements and installation of mechanical and electrical work indicated diagrammatically on Drawings.

1. Follow routing shown for pipes, ducts, and conduits as closely as possible; make runs parallel with lines of building.

2. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated; coordinate locations of fixtures and outlets with finish elements.

F. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other construction activities and activities of other contractors to avoid conflicts and ensure orderly progress of Work.

1.3 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings for areas where space availability is limited and necessitates maximum utilization of space for components and where separate entities, products, and materials require coordination.

1. Require each subcontractor with items located in ceiling space to furnish coordination drawings of their items to assist in preparation of Contractor's Coordination Drawings.

2. Indicate relationship of components shown on separate Shop Drawings.

3. Indicate required installation sequences.

4. Ceiling Spaces: Take special care to coordinate structure, ceiling systems, equipment located in ceiling spaces, fire protection systems, mechanical systems, and electrical systems.

B. Staff Names: Immediately after receipt of notice to proceed or immediately after signing of Contract by Owner and Contractor, submit list of principal staff assignments, including superintendent and other personnel in attendance at Project site.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.4 SUPERVISORY AND ADMINISTRATIVE PERSONNEL

A. Provide supervisory personnel, in addition to Project Superintendent, as required for proper and timely performance of Work and coordination of subcontracts.

B. Provide administrative staff as required to allow Project Superintendent and supervisory personnel to allocate maximum time to Project supervision and coordination.

1.5 PROJECT MEETINGS

A. Schedule and administer Project meetings throughout progress of Work:

1. Pre-construction meeting.
2. Progress meetings at weekly intervals.
3. Pre-installation conferences.
4. Coordination meetings.
5. Special meetings.

B. Make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within two days to Architect, Owner, participants, and those affected.

C. Attendance: Job superintendent, major subcontractors and suppliers as appropriate to agenda; Architect, Owner, and Owner and Architect's consultants as appropriate to agenda topics for each meeting.

D. Suggested Agenda: Review of Work progress, status of progress schedule and adjustments, delivery schedules, submittals, requests for information, maintenance of quality standards, pending changes and substitutions, and issues needing resolution.

END OF SECTION

SECTION 01 32 00

CONSTRUCTION SCHEDULE - NETWORK ANALYSIS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. References.

B. Performance requirements.

C. Quality assurance.

D. Qualifications.

E. Project record documents.

F. Submittals.

G. Review and evaluation.

H. Format.

I. Cost and schedule reports.

J. Early work schedule.

K. Construction schedule.

L. Short interval schedule.

M. Requested time adjustment schedule.

N. Recovery schedule.

O. Updating schedules.

P. Distribution.

1.2 REFERENCES

A. Construction Planning and Scheduling Manual - A Manual for General Contractors and the Construction Industry, The Associated General Contractors of America (AGC).

B. CSI - Construction Specifications Institute Master Format 2004 Edition and updates.

C. National Weather Service - Local Climatological Data.

1.3 PERFORMANCE REQUIREMENTS

A. Ensure adequate scheduling during construction activities so work may be prosecuted in

an orderly and expeditious manner within stipulated Contract Time.

B. Ensure coordination of Contractor and subcontractors at all levels.

C. Ensure coordination of submittals, fabrication, delivery, erection, installation, and testing of materials and equipment.

D. Ensure on-time delivery of Owner furnished materials and equipment.

E. Ensure coordination of jurisdictional reviews.

F. Assist in preparation and evaluation of applications for payment.

G. Assist in monitoring progress of work.

H. Assist in evaluation of proposed changes to Contract Time.

I. Assist in evaluation of proposed changes to Construction Schedule.

J. Assist in detection of schedule delays and identification of corrective actions.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with Construction Planning and Scheduling Manual published by the AGC.

B. Maintain one copy of document on site.

C. In the event of discrepancy between the AGC publication and this section, provisions of this section shall govern.

1.5 QUALIFICATIONS

A. Scheduler: Personnel or specialist consultant with 5 years minimum experience in scheduling construction work of a complexity and size comparable to this Project.

B. Administrative Personnel: 5 years minimum experience in using and monitoring schedules on comparable projects.

1.6 PROJECT RECORD DOCUMENTS

A. Submit record documents under provisions of Section 01 77 00.

B. Submit one reproducible and two copies of final Record Construction Schedule which reflects actual construction of this Project.

C. Record schedule shall be certified for compliance with actual way project was constructed.

D. Receipt of Record Construction Schedule shall be a condition precedent to any retainage release or final payment.

1.7 SUBMITTALS

A. Within 7 days from the Notice of Award submit proposed Early Work Schedule and preliminary Cost Report defining activities for first 60 days of Work.

B. Within 45 days from Notice of Award submit proposed Construction Schedule and final Cost Report.

C. Submit updated Construction Schedule at least 10 days prior to each Application for Payment.

D. Submit Short Interval Schedule at each Construction Progress Meeting.

E. Submit Time Adjustment Schedule within 10 days of commencement of a claimed delay.

F. Submit Recovery Schedules as required by completion of work.

G. Submit one reproducible and two copies of each schedule and cost report.

1.8 REVIEW AND EVALUATION

A. Early Work Schedule shall be reviewed during Preconstruction Conference with Owner and Architect.

B. Within 5 days of receipt of Owner and Architect's comments provide satisfactory revision to Early Work Schedule or adequate justification for activities in question.

C. Acceptance by Owner of corrected Early Work Schedule shall be a condition precedent to making any progress payments for first 60 days of Contract.

D. Cost loaded values of Early Work Schedule shall be basis for determining progress payments during first 60 days of Contract.

E. Participate in joint review of Construction Schedule and Reports with Owner and Architect.

F. Within 7 days of receipt of Owner and Architect's comments provide satisfactory revision to Construction Schedule or adequate justification for activities in question.

G. In the event that an activity or element of work is not detected by Owner or Architect review, such omission or error shall be corrected by next scheduled update and shall not affect Contract Time.

H. Acceptance by Owner of corrected Construction Schedule shall be a condition precedent to making any progress payments after first 60 days of Contract.

I. Cost-loaded values of Construction Schedule shall be basis for determining progress payments.

J. Review and acceptance by Owner and Architect of Early Work 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.

1.9 FORMAT

A. Prepare diagrams and supporting mathematical analyses using Precedence Diagramming Method, under concepts and methods outlined in AGC Construction Planning and Scheduling Manual.

B. Listings: Reading from left to right, in ascending order for each activity.

C. Diagram Size: 42 inches maximum height x width required.

D. Scale and Spacing: To allow for legible notations and revisions.

E. Illustrate order and interdependence of activities and sequence of work.

F. Illustrate complete sequence of construction by activity.

G. Provide legend of symbols and abbreviations used.

1.10 COST AND SCHEDULE REPORTS

A. Activity Analysis: Tabulate each activity of network diagram and identify for each activity:

1. Description.
2. Interface with outside contractors or agencies.
3. Number.
4. Preceding and following number.
5. Duration.
6. Earliest start date.
7. Earliest finish date.
8. Actual start date.
9. Actual finish date.
10. Latest start date.
11. Latest finish date.
12. Total and free float.
13. Identification of critical path activity.
14. Monetary value keyed to Schedule of Values.

15. Manpower requirements.

16. Responsibility.

17. Percentage complete.

18. Variance positive or negative.

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

1. Description.

2. Number.

3. Total cost.

4. Percentage complete.

5. Value prior to current period.

6. Value this period.

7. Value to date.

C. Required Sorts: List activities in sorts or groups:

1. By activity number.

2. By amount of float time in order of early start.

3. By responsibility in order of earliest start date.

4. In order of latest start dates.

5. In order of latest finish dates.

6. Application for payment sorted by Schedule of Values.

7. Listing of activities on critical path.

8. Listing of basic input data which generates schedule.

1.11 EARLY WORK SCHEDULE

A. Shall establish scope of work to be performed during first 60 days of Contract.

B. Shall designate critical path or paths.

C. Shall contain the following phases and activities:

1. Procurement activities to include mobilization, shop drawings and sample submittals.

2. Identification of key and long-lead elements and realistic delivery dates.

3. Construction activities in units of whole days limited to 14 days for each activity except non-construction activities for procurement and delivery.

4. Approximate cost and duration of each activity.

D. Shall contain seasonal weather considerations. Seasonal rainfall shall be 10 year average for the month as evidenced by Local Climatological Data obtained from U.S. National Weather Service.

E. Activities shall be incorporated into Construction Schedule.

F. No application for payment will be evaluated or processed until Early Work Schedule has been submitted and reviewed.

G. Shall be updated on a monthly basis while Construction Schedule is being developed.

H. Failure to submit an adequate or accurate Early Work Schedule or failure to submit on established dates will be considered a substantial breach of Contract.

1.12 CONSTRUCTION SCHEDULE

A. Include Early Work Schedule as first 60 days of Construction Schedule.

B. Shall be a computer generated time scaled network diagram of activities.

C. Indicate a completion date for project that is no later than required completion date subject to any time extensions processed as part of a change order.

D. Conform to mandatory dates specified in the Contract Documents.

E. Should schedule indicate a completion date earlier than any required completion date, Owner or Architect shall not be liable for any costs should project be unable to be completed by such date.

F. Seasonal weather shall be considered in planning and scheduling of all work. Seasonal rainfall shall be 10 year average for the month as evidenced by Local Climatological Data obtained from U.S. National Weather Service.

G. Level of detail shall correspond to complexity of work involved.

H. Indicate procurement activities, delivery, and installation of Owner furnished material and equipment.

I. Designate critical path or paths.

J. Subcontractor work at all levels shall be included in schedule.

K. As developed shall show sequence and interdependence of activities required for complete performance of Work.

L. Shall be logical and show a coordinated plan of Work.

M. Show order of activities and major points of interface, including specific dates of completion.

N. Duration of activities shall be coordinated with subcontractors and suppliers and shall be best estimate of time required.

O. Shall show description, duration and float for each activity.

P. Failure to include any activity shall not be an excuse for completing all work by required completion date.

Q. No activity shall have a duration longer than 14 days or a value over $20,000.00 except non-construction activities for procurement and delivery.

R. An activity shall meet the following criteria:

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.

2. Descriptions shall be clear and concise. Beginning and end shall be readily verifiable. Starts and finishes shall be scheduled by logical restraints.

3. Responsibility shall be identified with a single performing entity.

4. Additional codes shall identify building, floor, bid item and CSI classification.

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.

6. Each activity shall have manpower-loading assigned.

7. Major construction equipment shall be assigned to each activity.

8. Activities labeled start, continue or completion are not allowed.

S. For major equipment and materials show a sequence of activities including:

1. Preparation of shop drawings and sample submissions.

2. Review of shop drawings and samples.

3. Finish and color selection.

4. Fabrication and delivery.

5. Erection or installation.

6. Testing.

T. Include a minimum of 15 days prior to completion date for punch lists and clean up. No other activities shall be scheduled during this period.

1.13 SHORT INTERVAL SCHEDULE

A. Shall be fully developed horizontal bar-chart-type schedule directly derived from Construction Schedule.

B. Prepare schedule on sheet of sufficient width to clearly show data.

C. Provide continuous heavy vertical line identifying first day of week.

D. Provide continuous subordinate vertical line identifying each day of week.

E. Identify activities by same activity number and description as Construction Schedule.

F. Show each activity in proper sequence.

G. Indicate graphically sequences necessary for related activities.

H. Indicate activities completed or in progress for previous 2 week period.

I. Indicate activities scheduled for succeeding 2 week period.

J. Further detail may be added if necessary to monitor schedule.

1.14 REQUESTED TIME ADJUSTMENT SCHEDULE

A. 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.

B. If an extension of time is requested, a separate schedule entitled "Requested Time Adjustment Schedule" shall be submitted to Owner and Architect.

C. Indicate requested adjustments in Contract Time which are due to changes or delays in completion of work.

D. Extension request shall include forecast of project completion date and actual achievement of any dates listed in Agreement.

E. To the extent that any requests are pending at time of any Construction Schedule update, Time Adjustment Schedule shall also be updated.

F. Schedule shall be a time-scaled network analysis.

G. Accompany schedule with formal written time extension request and detailed impact analysis justifying extension.

H. 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.

I. Activity delays shall not automatically constitute an extension of Contract Time.

J. Failure of subcontractors shall not be justification for an extension of time.

K. Float is not for the exclusive use or benefit of any single party. Float time shall be apportioned according to needs of project.

L. 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.

M. Extensions will be granted only to extent that time adjustments to activities exceed total positive float of the critical path and extends Contract completion date.

N. Owner 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.

O. Owner shall not be responsible or liable for any construction acceleration due to failure of Owner 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.

P. In the event a Requested Time Adjustment Schedule and Time Impact Analysis are not submitted within 10 days after commencement of a delay it is mutually agreed that delay does not require a Contract time extension.

1.15 RECOVERY SCHEDULE

A. When activities are behind Construction Schedule a supplementary Recovery Schedule shall be submitted.

B. Form and detail shall be sufficient to explain and display how activities will be rescheduled to regain compliance with Construction Schedule.

C. Maximum duration shall be one month and shall coincide with payment period.

D. Ten days prior to expiration of Recovery Schedule verification to determine if activities have regained compliance with Construction Schedule will be made. Based upon this verification the following will occur:

1. Supplemental Recovery Schedule will be submitted to address subsequent payment period.

2. Construction Schedule will be resumed.

1.16 UPDATING SCHEDULES

A. Review and update schedule at least 10 days prior to submitting an Application for Payment.

B. Maintain schedule to record actual prosecution and progress.

C. Approved change orders which affect schedule shall be identified as separate new activities.

D. Change orders of less than $20,000.00 value or less than 3 days duration need not be shown unless critical path is affected.

E. No other revisions shall be made to schedule unless authorized by Owner.

F. Provide narrative Progress Report at time of schedule update which details the following:

1. Activities or portions of activities completed during previous reporting period.

2. Actual start dates for activities currently in progress.

3. Deviations from critical path in days ahead or behind.

4. List of major construction equipment used during reporting period and any equipment idle.

5. Number of personnel by craft engaged on Work during reporting period.

6. Progress analysis describing problem areas.

7. Current and anticipated delay factors and their impact.

8. Proposed corrective actions and logic revisions for Recovery Schedule.

9. Proposed modifications, additions, deletions and changes in logic of Construction Schedule.

G. Schedule update will form basis upon which progress payments will be made.

H. Owner will not be obligated to review or process Application for Payment until schedule and Progress Report have been submitted.

1.17 DISTRIBUTION

A. Following joint review and acceptance of updated schedules distribute copies to Owner, Architect, and all other concerned parties.

B. Instruct recipients to promptly report in writing any problem anticipated by projections shown in schedule.

END OF SECTION

SECTION 01 35 15

CALGREEN ENVIRONMENTAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Comply with CALGreen environmental requirements related to energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality.

1. Comply with specific CALGreen requirements as adopted by authorities having jurisdiction and applicable to Project.

1.2 ENVIRONMENTAL REQUIREMENTS

A. Mandatory Measures: Comply with CALGreen Mandatory Measures applicable to Project.

1. Design team and construction team are each required to participate to maximum degree possible to achieve CALGreen environmental requirements.

2. Contract Documents are not intended to limit alternative means of achieving environmental requirements.

a. Suggestions from Contractor, subcontractors, suppliers, and manufacturers for achieving environmental requirements are encouraged; team approach is also encouraged.

3. Voluntary Tiers: Verify extent of Voluntary Tiers applicability to Project.

a. Construction team is encouraged to work with Owner and Design Team to incorporate additional measures as defined in CALGreen Appendixes.

b. Contact Owner and Architect regarding extent of intent of Project to reach Voluntary Tiers, additional work necessary to achieve enhanced Voluntary Tiers, and potential costs involved in achieving each Voluntary Tier.

c. Construction team is required to achieve Mandatory Measures and Voluntary Tiers as applicable, and to achieve as much as possible without unacceptable cost impact or schedule impact as determined by Owner.

B. Requirements: Construction team is required to review CALGreen requirements relative to Project related to following.

1. Energy Efficiency: Comply with California Energy Commission requirements.

2. Water Efficiency and Conservation: Comply with requirements for both indoor and outdoor water use.

3. Material Conservation and Resource Efficiency:

a. Nonresidential Projects: Provide weather-resistant exterior wall and foundation envelope including prevention of landscape irrigation spray on structures (if any) and prevent water intrusion at exterior entries.

b. Provide construction waste management plan as defined by CALGreen with demolition and construction waste diverted from landfill by recycling or salvage for reuse.

c. Nonresidential Projects Building Maintenance and Operation: Provide for commissioning requirements as required by CALGreen including but not limited to testing, documentation and training, testing and adjusting.

4. Nonresidential Projects Environmental Quality: Comply with following as adopted by authorities having jurisdiction and as applicable to Project.

a. Mechanical Equipment Pollution Control: Cover duct and related air distribution component openings to prevent dust and debris accumulation.

b. Finish Material Pollution Control: Comply with CALGreen requirements for volatile organic compound (VOC) emissions including but not necessarily limited to following (as applicable):

1) Adhesives, sealants and caulks.
2) Paints and coatings.
3) Carpet systems including carpet, carpet cushion, and adhesives.
4) Resilient flooring systems.
5) Composite wood products formaldehyde limitations.

c. Filters: Comply with requirements for mechanically ventilated buildings to have air filtration media for outside and return air prior to occupancy.

d. Environmental Tobacco Smoke (ETS) Control: Comply with CALGreen requirements for ETS.

e. Interior Moisture Control: Comply with California Building Code requirements and CALGreen requirements for vapor retarder at concrete slab foundations and capillary break (aggregate base).

f. Building Material Moisture Content: Do not use water damaged building materials, remove and place wet and high moisture content insulation, and do not enclose wall or floor framing when moisture content exceeds 19%.

g. Indoor Air Quality: Comply with CALGreen requirements for outside air delivery and carbon dioxide monitoring.

h. Environmental Comfort: Comply with CALGreen requirements for whole acoustical control and interior sound control.

i. Outdoor Air Quality: Comply with CALGreen requirements for reduction of greenhouse gases and ozone depletion.

1.3 QUALITY ASSURANCE

A. Project Management and Coordination: Contractor to identify one person on Contractor's staff to be responsible for CALGreen issues compliance and coordination.

1. Experience: Environmental project manager to have experience relating to CALGreen building construction.

2. Responsibilities: Carefully review Contract Documents for CALGreen issues, coordinate work of trades, subcontractors, and suppliers; instruct workers relating to environmental issues; and oversee Project Environmental Goals.

a. Submittals: Collect, compile, verify, and maintain sufficient information for submittals indicating compliance with applicable CALGreen requirements.

3. Meetings: Discuss CALGreen Goals at following meetings.

a. Pre-construction meeting.
b. Pre-installation meetings.
c. Regularly scheduled job-site meetings.

B. CALGreen Issues Criteria: Comply with requirements listed in CALGreen and various Specification sections.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General Issues: Do not use materials with moisture stains or with signs of mold or mildew.

1. Moisture Stains: Materials that have evidence of moisture damage, including stains, are not acceptable, including both stored and installed materials; immediately remove from site.

2. Mold and Mildew: Materials that have evidence of growth of molds or of mildew are not acceptable, including both stored and installed materials; immediately remove from site.

2.2 SUBSTITUTIONS

A. Substitutions Environmental Issues: Requests for substitutions shall comply with requirements specified in Section 01 25 00 – Substitution Procedures, with following additional information required where environmental issues are involved.

1. Indicate each proposed substitution complies with CALGreen requirements.

2. Owner and Architect reserve right to reject proposed substitutions where CALGreen information is not provided and where substitution may impact mandatory requirements or Project voluntary tier requirements.

PART 3 - EXECUTION

3.1 PROTECTION

A. Environmental Issues: Protect interior materials from water damage; where interior products not intended for wet applications are exposed to moisture, immediately remove from site.

1. Protect installed products using methods that do not support growth of molds and mildews. Immediately remove from site materials with mold and materials with mildew.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general quality control requirements.

1. General quality control.
2. Manufacturers' field services.
3. Mock-ups.
4. Independent testing laboratory services and inspections.

B. Related Requirements:

1. Refer to applicable codes and Specifications sections for test requirements.

1.2 QUALITY CONTROL, GENERAL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.3 MANUFACTURER'S FIELD SERVICES

A. When specified in respective Specification sections, require manufacturer or supplier to have qualified personnel provide on-site observations and recommendations.

1. Observe field conditions, including conditions of surfaces and installation.
2. Observe quality of workmanship.
3. Provide recommendations to assure acceptable installation and workmanship.
4. Where required, start, test, and adjust equipment as applicable.

B. Representative shall submit written report to Architect or Owner listing observations and recommendations.

1.4 MOCK-UPS

A. Erect field samples and field mock-ups at locations on site as approved in advance and in accordance with requirements where included in Specifications section.

1. Test mock-ups requiring special equipment may be erected at location having access to necessary equipment; coordinate with Architect.

B. Field samples and mock-ups not approved and not capable of being acceptably revised shall be removed from site.

C. Approved field samples and mock-ups may be used as part of Project.

1.5 TESTING LABORATORY SERVICES AND INSPECTIONS

A. Testing laboratory services and inspections specified and required by applicable codes and regulations will be performed by firms independent of firms related to construction operations and shall be acceptable to applicable authorities.

1. Notify Owner immediately where potential conflict of interest may be involved with testing laboratories or inspection services for Project.

2. Owner or Architect may also require independent testing of items where doubts exist that product or system does not conform to Contract Documents.

3. Owner will employ and pay for testing laboratory and special inspectors to provide Project specific testing and inspections under applicable codes and Specification sections except where indicated otherwise.

a. Owner employment of testing laboratory and inspectors shall not relieve Contractor of obligation to perform Work in accordance with requirements of applicable codes and Contract Documents.

1) Laboratory and inspectors may not release, revoke, alter, or enlarge on requirements of Contract Documents.

b. Retesting required because of non-conformance to specified requirements shall be performed by Owner's testing laboratory.

1) Payment for retesting shall be charged to Contractor by deducting inspection and testing charges from Contract amount.

c. Owner provided testing shall be limited to Project specific testing and shall not include general tests or approvals of materials, equipment or systems.

d. Owner provided inspections shall be limited to Project design team inspections and special inspectors required by applicable authorities.

B. Services shall be performed in accordance with requirements of governing authorities and with specified standards.

C. DSA Projects: Testing and inspections shall be performed in accordance with DSA 103 Form.

D. Reports will be submitted to Architect in duplicate giving observations and results of tests and inspections, indicating compliance or non-compliance with specified standards and with Contract Documents.

1. Where required, testing laboratory and inspectors will submit copy of tests and inspections directly to enforcing agency.

E. Contractor shall cooperate with testing laboratory and inspection personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.

1. Notify Owner, Architect, inspectors, and testing laboratory sufficiently in advance of expected time for operations requiring inspection and testing services.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes temporary construction facilities and temporary controls.

1. Electricity and lighting.
2. ventilation.
3. Water and sanitary facilities.
4. Construction aids.
5. Temporary enclosures.
6. Barriers.
7. Cleaning during construction.
8. Project identification.
9. Field offices.
10. Cellular telephone service.
11. Storage.

B. Related Requirements:

1. Section 01 70 00: Progress cleaning and final cleaning.
2. Section 01 74 10: Waste management.

C. Provide temporary construction facilities and temporary controls as required to conform to applicable authorities and as required to complete Project in accordance with Contract Documents.

1. Authorities: Contact governing authorities to establish extent of temporary facilities and temporary controls required by authorities.

1.2 ELECTRICITY AND LIGHTING

A. Provide electrical service required for construction operations, with branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.

1. Connection to existing electrical service is permitted.

B. Provide lighting for construction operations.

1. Permanent lighting may be used during construction; maintain lighting and make routine repairs.

C. Owner will pay costs of energy used from existing on-site services.

1.3 HEAT AND VENTILATION

A. Provide heat and ventilation as required to maintain specified conditions for construction operation, to protect materials and finishes from damage due to temperature and humidity.

B. Owner will pay costs of energy used from existing on-site services.

1.4 WATER AND SANITARY FACILITIES

A. Provide water service required for construction operations; extend branch piping with outlets located so water is available by use of hoses.

1. Connection to existing facilities is permitted.

2. Owner will pay for water used from existing on-site services.

B. Provide and maintain required sanitary facilities and enclosures.

1.5 CONSTRUCTION AIDS

A. Noise, Dust and Pollution Control: Provide materials and equipment necessary to comply with local requirements for noise, dust and pollution control.

B. Fire Protection: Maintain on-site fire protection facilities as required by applicable authorities and insurance requirements.

C. Security: Protect Site and Work; prevent unauthorized entry, vandalism, and theft.

1. Coordinate with Owner’s security program.

D. Dewatering: Provide and operate drainage and pumping equipment; maintain excavations and site free of standing water.

1.6 ENCLOSURES

A. Temporary Closures: Provide temporary weather-tight closures for exterior openings for acceptable working conditions, for protection for materials, to protect interior materials from dampness, for temporary heating, and to prevent unauthorized entry.

1. Provide doors with self-closing hardware and locks.

B. Temporary Partitions: Provide temporary partitions as required to separate work areas from completed areas, to prevent penetration of dust and moisture into completed areas, and to prevent damage to finished areas and installed equipment.

1. Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces; Flame Spread Rating of 25 in accordance with ASTM E84.

1.7 BARRIERS

A. Barriers: Provide barriers as required to prevent public entry to construction areas and to protect adjacent properties from damage from construction operations.

1. Fence: Provide minimum 8-foot high commercial grade chain link or painted solid wood fence around construction site; equip with gates with locks.

2. Covered Walkways: Provide lighted covered painted walkways as required by governing authorities for public rights-of-way and for public access to existing building.

B. Barricades: Provide barricades as required by governing authorities.

C. Tree Protection: Provide barriers around trees and plants designated to remain; protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

1.8 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; recycle or dispose of off-site.

B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.9 PROJECT IDENTIFICATION

A. Project Sign: Provide minimum 32-square foot Project identification sign of wood frame and exterior grade plywood construction, painted, with computer generated graphics by professional sign maker.

1. Design: As furnished by Architect.

2. Submit to Owner and Architect additional names or changes proposed to Project sign for prior written approval.

3. Erect on site at location established by Architect.

B. Other Signs: Subject to approval of Architect and Owner.

1.10 FIELD OFFICES

A. Field Office: Provide weather-tight field office, with lighting, electrical outlets, data outlets, heating, and ventilating equipment, and equipped with furniture.

1. Meeting Space: In addition, provide space for Project meetings with table and chairs to accommodate minimum six persons.

2. Telephone Service: Provide telephone service to field office.

3. Multi-Purpose Copier: Provide plain paper multi-purpose color and black-and-white copier with enlargement and reduction capability and with built-in printer, scanner, and facsimile capabilities.

1.11 CELLULAR TELEPHONE SERVICE

A. Cellular Telephone Service: Furnish on-site Project Managers with cellular telephone. Ensure Owner and Architect ability to contact site during construction operations.

1. Schedules: Submit schedules of on-site Project Managers with individual cellular telephone numbers to Owner and Architect; maintain schedules and cell phone numbers up to date during Project on-site operations.

1.12 STORAGE

A. Storage for Tools, Materials, and Equipment: Limit on-site storage to Project area; provide weather-tight storage, with heat and ventilation for products requiring controlled conditions.

1. Maintain adequate space for organized storage and access.

2. Provide lighting for inspection of stored materials.

1.13 REMOVAL

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.

B. Clean and repair damage caused by installation or use of temporary facilities.

C. Restore existing facilities used during construction to specified or original condition.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes basic product requirements governing material and equipment.

1. General product requirements.
2. Product list.
3. Quality assurance.
4. Delivery, storage, and handling.

B. Related Requirements:

1. Section 01 25 00: Substitution procedures.
2. Section 01 30 00: Submittal of manufacturers' certificates.
3. Section 01 77 00: Operation and maintenance data.

1.2 GENERAL PRODUCTS REQUIREMENTS

A. Products include material, equipment, and systems.

B. Comply with Specifications, referenced standards, and applicable codes and regulations as minimum requirements.

C. Provide new materials except as specifically allowed by Contract Documents.

D. Materials to be supplied in quantity within a Specification section shall be by one manufacturer, shall be the same, and shall be interchangeable.

E. Provide equipment and systems composed of materials from a single manufacturer except where otherwise recommended by equipment or systems manufacturer or where otherwise indicated in Contract Documents.

F. Contractor’s Options: Comply with following options; requests for substitutions for named manufacturers and products shall comply with requirements specified in Section 01 25 00 – Substitution Procedures.

1. Products Identified by Reference Standards: Select product meeting referenced standard for products specified only by reference standard.

a. Requests for Substitutions to be limited to products not complying with referenced standards.

1) Submit justification for non-compliance with reference standards as part of Request for Substitutions; if product is foreign made submit rationale why foreign standards and basic materials indicates compliance.

2. Named Manufacturers: Where names of manufacturers are specified select any named manufacturer product meeting Specifications for products specified by naming one or more manufacturers.

    a. Submit Request for Substitution for any manufacturer not named.

3. Named Manufacturers and Named Products: Select any named manufacturer named product meeting Specifications for products specified by naming one or more manufacturers and products.

    a. Where only one manufacturer and product is named together with additional manufacturers without specific products, Requests for Substitutions to be limited to products not comparable to that specified.

        1) Contractors, subcontractors, suppliers, and manufacturers shall take special care to ensure comparable products are being supplied based on design, performance, quality, and longevity.

        2) Substitutions: Submit Request for Substitution for any manufacturer not named and for products not comparable to those specified in design, performance, quality, and longevity.

4. Basis of Design: Where manufacturer or manufacturer and product both are indicated as Basis of Design, submit Request for Substitution for other manufacturers and products.

5. “Or Equal” Clauses: Submit request for substitution for manufacturer or product not specifically named in Specifications where terms "or equal", "or approved equal", or similar references are made.

G. Nameplates: Do not attach or imprint manufacturer or producer nameplates on exposed surfaces in occupied spaces except for required labels and operating data.

    1. Equipment Nameplates: Provide permanent nameplate on service connected and power operated equipment located on easily accessible surface inconspicuous in occupied spaces.

        a. Provide name of product and manufacturer, model and serial number, capacity, speed, rating, and similar information.

1.3 SUBMITTALS

A. Product List: Within 35 days after award of Contract, submit to Owner and Architect a complete list of major products proposed for installation, with name of manufacturer, trade name, and model.

B. Product List: Prior to submittal of second Request for Payment, submit to Architect complete list of major products which are proposed for installation, with name of manufacturer, trade name, and model.

1. Tabulate products by Specification number and title.

C. Substitutions: Refer to Section 01 25 00 – Substitution Procedures.

1.4 QUALITY ASSURANCE

A. Comply with industry standards and applicable codes except when more restrictive tolerances or requirements indicate more rigid standards or precise workmanship.

B. Perform work by persons qualified to produce workmanship of specified quality.

C. Install products straight, true-to-line, and in correct relationship to adjacent materials, with hairline joints, free of rough, sharp and potentially hazardous edges.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1. Seismic Anchors: Conform to code requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Transport products by methods to avoid product damage, deliver in undamaged condition in manufacturer's unopened containers or packaging.

B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

C. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

F. Arrange storage to provide access for inspection; periodically inspect to assure products are undamaged and are maintained under required conditions.

G. Provide equipment and personnel to handle products by methods to prevent soiling and prevent damage.

H. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.

I. Immediately remove from Project products damaged, wet, stained, and products with mold and products with mildew.

1. Take special care to prevent absorbent products such as gypsum board and acoustical ceiling units from becoming wet.

END OF SECTION

SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes execution requirements.

1. Installer qualifications.
2. Examination.
3. Manufacturer's instructions.
4. Installation.
5. Cleaning.
6. Protection.

B. Related Requirements:

1. Section 01 50 00: Cleaning during construction.
2. Section 01 77 00: Closeout procedures.
3. Section 01 79 00: Demonstration and training.

1.2 INSTALLER QUALIFICATIONS

A. Experienced Installers: Installers to have minimum five-years successful experience installing items like those required for Project, except for individuals in training under direct supervision of experienced installer.

1.3 EXAMINATION

A. Acceptance of Conditions: Beginning installation of a product signifies installer has examined substrates, areas, and conditions for compliance with manufacturer requirements for tolerances and other conditions affecting performance.

B. Field Measurements: Take field measurements as required to fit Work properly; recheck measurements prior to installing each product.

1. Where portions of Work are to fit to other construction verify dimensions of other construction by field measurements before fabrication; allow for cutting and patching to avoid delaying Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

1.4 MANUFACTURERS' INSTRUCTIONS

A. Manufacturer’s Recommendations: When work is specified to comply with manufacturers' recommendations or instructions, distribute copies to persons involved and maintain one set in field office.

1. Conform to requirements specified in Section 01 30 00 for submittal of recommendations or instructions to Architect; submit to Architect only where specified or where specifically requested; otherwise keep in Field Office.

B. Perform work in accordance with details of recommendations and instructions and specified requirements.

1. Should a conflict exist between Specifications and recommendations or instructions consult with Architect.

C. Where manufacturer's information notes special recommendations in addition to installation instructions, comply with both recommendations and instructions.

1.5 INSTALLATION

A. Pre-Installation Meetings: Installers and suppliers are to attend pre-installation meetings scheduled by Contractor.

B. Comply with manufacturers written recommendations and installation instructions unless more restrictive requirements are specified.

C. Locate Work and components accurately, in correct alignment and elevation.

1. Make vertical work plumb and horizontal work level.

2. Install components to allow space for maintenance and ease of removal for replacement.

D. Install products at time and under conditions to ensure best possible results; maintain conditions required for product performance until Substantial Completion.

E. Conduct operations so no part of Work is subject to damaging operations or excessive loads during normal conditions.

F. Securely anchor permanent construction in place, accurately located and aligned with other portions of Work.

G. Allow for building movement including thermal expansion and contraction.

H. Make joints of uniform width; arrange joints as indicated, for best visual effect where not otherwise indicated; fit exposed connections together to form hairline joints except where otherwise indicated.

1.6 CLEANING

A. Cleaning During Construction: Specified in Section 01 50 00 - Temporary Facilities and Controls.

B. Progress Cleaning: Keep installed areas clean using cleaning materials specifically recommended by manufacturers of product being cleaned; where not otherwise recommended use nontoxic materials that will not damage surfaces.

1. Remove debris from concealed spaces before enclosing space.

2. Supervise construction operations to assure no part of construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

C. Final Cleaning: Execute final cleaning at Substantial Completion.

1. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces.

a. Vacuuming Equipment: Type with high efficiency particulate arrestor (HEPA) type filters; properly maintained.

2. Clean equipment and fixtures to a sanitary condition, clean filters of mechanical equipment, replace filters where cleaning is impractical.

a. Clean ducts.

3. Clean site; sweep paved areas.

4. Remove waste, surplus materials and rubbish from Project and site; recycle to maximum extent feasible.

1.7 PROTECTION

A. Protect products subject to deterioration with impervious cover. Provide ventilation to avoid condensation and trapping water.

B. Take care to use protective covering and blocking materials that do not soil, stain, or damage materials being protected.

C. After installation, provide coverings to protect products from damage from traffic and construction operations, remove when no longer needed.

D. Protect interior materials from water damage; immediately remove wet materials from site to prevent growth of mold and mildew on site.

END OF SECTION

SECTION 01 73 00

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Contractor is responsible for cutting, fitting and patching to complete Work and to:

1. Make its parts fit together properly.
2. Uncover work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to Contract Documents.
5. Remove samples of installed work as required for testing.
6. Provide routine penetrations of non-structural surfaces for installation of piping.
7. Provide routine penetrations of non-structural surfaces for installation of conduit.

B. Related Requirements:

1. Section 01 50 00: Temporary facilities and controls.
2. Section 02 41 00: Structure demolition.
3. Section 02 41 20: Selective building demolition for remodeling.

1.2 SUBMITTALS

A. Submit written request well in advance of cutting or alteration which affects:

1. Work of Owner or separate contractor.
2. Structural value or integrity of any element of Project.
3. Integrity of weather-exposed or moisture-resistant elements.
4. Efficiency, operational life, maintenance or safety of operational elements.
5. Visual qualities of sight-exposed elements.

B. Request shall include:

1. Identification of Project and description of affected work.
2. Necessity for cutting or alteration.
3. Effect on work of Owner or separate contractor.
4. Effect on structural integrity, or weatherproof integrity of Project.
5. Alternatives to cutting and patching.
6. Cost proposal, when applicable.
7. Written permission of separate contractor whose work will be affected.
8. Description of proposed work including:

    a. Scope of cutting, patching, alteration, or excavation.
    b. Products proposed to be used.
    c. Extent of refinishing to be included.

C. Should conditions of Work or schedule indicate a change of products from original installation, Contractor shall submit request for substitution as specified in Section 01 25 00 – Substitution Procedures.

D. Submit written notice to Architect designating date and time work will be uncovered.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with Specifications and standards for each specific product involved.

B. Where Specifications and standards have not been provided, provide materials and fabrication consistent with quality of Project and intended for commercial construction.

C. Provide new materials for cutting and patching unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of products, or performance of work.

C. Report unsatisfactory or questionable conditions to Architect in writing; do not proceed with work until Architect has provided further instructions.

3.2 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

1. Provide services of licensed engineer for designing temporary support where required by applicable authorities for temporary supports and for shoring; submit engineering calculations directly to applicable authorities upon request.

B. Protect other portions of Project from damage.

3.3 PERFORMANCE

A. Execute cutting by methods that provide proper surfaces to receive installation of repairs and finishes.

1. Execute excavating and backfilling by methods which will prevent settlement, and which will prevent damage to other work.

B. Employ same installer or fabricator to perform cutting and patching work as employed for new construction for:

1. Weather-exposed or moisture resistant elements.

2. Sight-exposed finished surfaces.

C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

D. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.

E. Fit work tight to pipes, sleeves, ducts, conduit and penetrations through surfaces.

F. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.

2. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01 74 10

WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Project requires special Waste Management Program.
   1. CALGreen Waste Management: As required in Section 01 35 15.
   2. Provide itemization of costs related to Waste Management Program.
   3. Effect optimum control of solid wastes.
   4. Prevent environmental pollution and damage.

B. Related Work:
   1. Section 01 35 15: CALGreen environmental requirements.
   2. Section 01 50 00: Temporary facilities and controls.

1.2 DEFINITIONS

A. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively.

B. Class III Landfill: A landfill that accepts non-hazardous waste such as household, commercial, and industrial waste, including construction, remodeling, repair, and demolition operations.

C. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.

   1. Rubbish: Includes both combustible and noncombustible wastes, such as paper, boxes, glass, crockery, metal and lumber scrap, tin cans, and bones.

   2. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings that result from construction or maintenance and repair work.

D. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.

E. Sanitary Wastes:

   1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.

   2. Sewage: Domestic sanitary sewage.

1.3 SUBMITTALS

A. Waste Management Program: Comply with Contract Documents and applicable code requirements for salvaging, recycling, and disposing of nonhazardous waste.

1. Prior to commencement of Work, schedule and conduct meeting with Owner and Architect to discuss proposed Waste Management Program.

2. Develop mutual understanding relative to details of recycling, and rebate programs.

3. Prepare and submit a written and graphic Waste Management Program including, but not limited to, the following:

a. Indicate procedures to be implemented.

b. Estimate total Project waste to be generated, and estimated cost of disposing of Project waste in landfills.

c. Estimate total cubic yards of following waste categories to be diverted from landfill.

1) Clean dimensional wood, palette wood.
2) Plywood, oriented strand board, and medium density fiberboard.
3) Cardboard, paper, packaging.
4) Other items as directed by Owner and Architect.

d. Estimate amounts of following waste categories in appropriate units (weight, feet, square yards, gallons).

1) Metals.
2) Paint.
3) Other items as directed by Owner and Architect.

e. Submit permit or license and location of waste disposal areas.

f. Submit procedures for recycling/re-use program.

g. Submit procedures for rebate programs.

h. Revise and resubmit Waste Management Program as required by Owner and Architect.

1) Review of Contractor's Waste Management Program will not relieve Contractor of responsibility for control of pollutants and other environmental protection measures.

B. Submit summary of solid waste generated by Project with each application for progress payment, on form acceptable to Owner and Architect; include manifests, weight tickets, receipts, and invoices identifying Project and waste delivered to following locations.

1. Recycling Centers.
2. Class III landfills.
3. Inert fills.

C. Prepare rebate information and product documentation as required for Owner to qualify for rebate programs; submit with final closeout submittals.

1. Where feasible submit in electronic format, otherwise in 3-ring binder.

1.4 RECYCLING PROGRAM

A. Recycling: Implement recycling program that includes separate collection of waste materials of following types as applicable to Project requirements; recycling program to be applied by Contractors and subcontractors.

1. Land clearing debris.
2. Asphaltic concrete.
3. Concrete.
4. Masonry materials.
5. Ferrous metal.
6. Non-ferrous metal.
7. Clean dimensional wood and palette wood.
8. Plywood, oriented strand board, and medium density fiberboard.
9. Paper - bond.
10. Paper - newsprint.
11. Cardboard and paper packaging materials.
12. Glass.
13. Plastics.
14. Gypsum board (unpainted).
15. Paint.
16. Rigid foam.
17. Carpet and pad.
18. Beverage containers.
19. Porcelain plumbing fixtures.
20. Insulation.
21. Others as appropriate.

B. Handling: Keep materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.

1. Clean materials contaminated prior to placing in collection containers.

2. Arrange for collection by or delivery to appropriate recycling center or transfer station that accepts construction and demolition waste for purpose of recycling.

C. Participate in Re-Use Programs: Rebates, tax credits, and other savings obtained for recycled or re-used materials shall accrue to Contractor.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes Contract closeout procedures.

1. Substantial Completion.
2. Final Completion.
3. Project record documents.
4. Material and finish data.
5. Operation and maintenance manuals.

B. Related Requirements:

1. Section 01 30 00: Administrative requirements including attic stock.
2. Section 01 78 00: Warranties.
3. Section 01 79 00: Demonstration and training.

1.2 SUBSTANTIAL COMPLETION

A. Immediately prior to Substantial Completion, schedule agency reviews as required for “temporary certificate of occupancy” or for “certificate of occupancy”.

B. When Contractor considers Work, or a designated portion thereof is substantially complete, submit written notice, with list of items to be completed or corrected.

1. List (“Punch List”): Format pre-approved by Owner and Architect; tabular form with each space listed required.

C. Within a reasonable time, Owner and Architect will inspect status of completion and may add to “Punch List”.

1. Contractor shall pay for Architect's time and direct expenses where more than one Substantial Completion inspection is required.

D. Should Owner and Architect determine Work is not substantially complete, Contractor will be promptly notified in writing, giving reasons.

E. Contractor shall remedy deficiencies and send a second written notice of substantial completion; Architect will reinspect Work.

1. Contractor shall pay for Architect's time and direct expenses where more than one Substantial Completion inspection is required.

F. When Work is determined to be substantially complete by Architect, a Certificate of Substantial Completion will be prepared in accordance with General Conditions.

G. DSA Projects: Contractor shall complete DSA 6-C Form and upload electronically to DSA BOX within three days of completion of Work.

1.3 FINAL COMPLETION

A. When Work is complete, submit written certification indicating:

1. Work has been inspected for compliance with Contract Documents.

2. Work has been completed in accordance with Contract Documents and deficiencies listed (in 'Punch List") with Certificate of Substantial Completion have been corrected.

3. Equipment and systems have been tested in presence of Owner's representative and are operational.

4. Work is complete and ready for final inspection.

B. Special Submittals: In addition to submittals required by Contract, submit following.

1. Provide submittals required by governing authorities to governing authorities with copies included in Project Record Documents.

2. Submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 PROJECT RECORD DOCUMENTS

A. Keep documents current; do not permanently conceal any work until required information has been recorded.

1. Owner will provide Contractor with a separate set of Drawings to maintain for Project Record Documents.

2. Store reproducible Drawings, one set of Project Manual, and one copy of each Change Order separate from documents used for construction, for use as Project Record Documents.

3. Indicate actual work on Drawings; indicate actual products used in Project Manual, including manufacturer, model number and options.

4. Update Project Record Documents daily and allow for Architect inspection at least once a month.

B. At Contract close-out submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

C. As-Built Documents: General Contractor shall have electronic "As Built" sets of Contract Documents (Project Drawings and Project Specifications) prepared prior to Final Completion.

1. Contractor shall use one complete electronic set of Contract Documents (Drawings and Specifications) for use for "As-Builts".

2. As-Built Drawings: Revise Drawings based on Record Documents and field measurements made after installation and indicate actual locations of structural elements, ducts, piping, wiring, and equipment.

    a. Professional draftspersons experienced in electronic media used for Contract Documents shall revise original Project Drawings based on information recorded on Project Record Documents.

3. As-Built Specifications: Revise Specifications to indicate manufacturers who provided materials specified along with specifics indicating accessories, options, and finishes used in Project.

    a. Cross referencing Submittal records is acceptable for accessories only.

4. Review Submittal: Submit two copies of electronic media of “As-Built” Documents to Architect for review.

    a. After Architect review, revise where indicated and submit final electronic media to Owner.

D. Final Completion Submittal: At Project Completion submit both Project Record Documents and As-Built Documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

1.5 MATERIAL AND FINISH DATA

A. Provide data for primary materials and finishes.

B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.

1. Electronic Format: Where available in electronic format, submit USB 3.0 flash drives with information required for material and finish data.

C. Arrange by Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:

1. Trade names, model or type numbers.
2. Cleaning instructions.
3. Product data.
4. Maintenance recommendations.

1.6 OPERATION AND MAINTENANCE MANUALS

A. Provide manuals for:

1. Electrically operated items.
2. Electrical equipment and controls.
3. Maintenance manuals provided as part of Submittals.

B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.

C. Provide a separate volume for each system, with a table of contents and index tabs for each volume.

D. Arrange by Specification division and gives names, addresses, and telephone numbers of Subcontractors and suppliers. List:

1. Appropriate design criteria.
2. List of equipment and parts lists.
3. Operating and maintenance instructions.
4. Shop drawings and product data.

E. Electronic Format: Where available in electronic format, submit two USB 3.0 flash drives with information required for operation and maintenance manuals.

END OF SECTION

SECTION 33 40 00

STORM DRAIN UTILITIES

PART I – GENERAL

1.1 SUMMARY

A. This Section includes storm drainage piping; sub-surface drains; metal covers, grates and frames; catch basins; box culverts; manholes, and BMPs.

1. Best Managements Practices (BMPs):
    a. Proprietary Detention BMPs - Precast Concrete.
    b. Cartridge Media Filters.
    c. Hydrodynamic Separation Devices.
    d. Catch Basin Inserts.
    e. Downspout Filters.
    f. Stormwater Interceptors.
    g. Proprietary Retention/Infiltration BMPs – Polypropylene or Polyethylene.
    h. Proprietary Retention/Infiltration BMPs – Precast Concrete.
    i. Proprietary Biotreatment Devices.
2. Closed-circuit television inspection of storm drain lines.

1.2 RELATED REQUIREMENTS

1. Division 01 - General Requirements.
2. Section 22 1000 - Plumbing.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2323 - Excavation and Fill for Utilities.
5. Section 32 0117 - Pavement Repair.
6. Section 32 1313 - Site Concrete Work.

1.3 DEFINITIONS

A. AASHTO: American Association of State Highway and Transportation Officials.
B. ASME: American Society of Mechanical Engineers.
C. ASTM: American Society for Testing and Materials.
D. BMP: Stormwater Best Management Practice.
E. CBC: California Building Code.
F. CCTV: Closed-Circuit Television.
G. DET: Detention BMP.
H. DWV: Drain, Waste, and Vent.
I. FILT: Filter BMP.
J. GS: Gravity Separator.

K. HDPE: High Density Polyethylene.
L. IAPMO: International Association of Plumbing and Mechanical Officials.
M. IOR: Inspector of Record.
N. NPS: Nominal Pipe Size.
O. OAR: OWNER's Authorized Representative.
P. PE: Polyethylene
Q. Post Construction BMP: Devices installed by the CONTRACTOR for storm water management to be left on site after construction completion.
R. PP: Polypropylene.
S. PVC: Poly Vinyl Chloride.
T. RET: Retention.
U. SDR: Standard Dimensions Ratio.
V. VEG: Vegetative.
W. OWNER: Inglewood Unified School District.
X. SWPPP: Storm Water Pollution Prevention Plan.

1.4 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO):

1. ASHTO M 252: Geotextile Specification for Highway Applications.
2. AASHTO M 294: Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter.
3. AASHTO M 330: Standard Specification for Polypropylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter.

B. American Society for Testing and Materials International (ASTM):

1. ASTM A888: Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
2. ASTM C14: Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.
3. ASTM C443: Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
4. ASTM C564: Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
5. ASTM C76: Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
6. ASTM C857: Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
7. ASTM C858: Standard Specification for Underground Precast Concrete Utility Structures.

8. ASTM C891: Standard Practice for Installation of Underground Precast Concrete Utility Structures.
9. ASTM D2564: Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
10. ASTM D2665: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
11. ASTM D2855: Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
12. ASTM D3034: Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
13. ASTM D3212: Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
14. ASTM D448: Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
15. ASTM F1866: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Schedule 40 Drainage and DWV Fabricated Fittings.
16. ASTM F2306: Standard Specification for 12 to 60 in. [300 to 1500 mm] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.
17. ASTM F2418: Standard Specification for Polypropylene Corrugated Wall Stormwater Collection Chambers.
18. ASTM F2764: Standard Specification for 6 to 60 in. [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications.
19. ASTM F2787: Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers.
20. ASTM F2881: Standard Specification for 12 to 60 in. [300 to 1500 mm] Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications.
21. ASTM F2922: Standard Specification for Polyethylene Corrugated Wall Stormwater Collection Chambers
22. ASTM F477: Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
23. ASTM F656: Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
24. ASTM F794: Standard Specification for Poly (Vinyl Chloride) (PVC)

Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

C. Cast Iron Soil Pipe Institute (CISPI):

1. CISPI 301: Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
2. CISPI 310: Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

D. The International Association of Plumbing and Mechanical Officials (IAPMO):

1. IAPMO IS 6: Hubless Cast Iron Sanitary and Rainwater Systems - Installation Standards.

D. Standard Specifications for Public Works Constructions (Greenbook):

1. Section 202: Masonry Materials.
2. Section 206: Miscellaneous Metal Items.
3. Section 207: Pipe.
4. Section 208: Pipe Joint Types and Materials.
5. Section 210: Paint and Protective Coatings.
6. Section 306: Underground Conduit Construction

1.5 SUBMITTALS

A. Shop Drawings: Submit site plan denoting locations of lines, valves, and appurtenances.

B. Product Data: Manufacturer’s catalog data for all required materials. Include technical data for accessories, information concerning gaskets, joints and couplings.

C. Certificates: Certificates attesting that tests set forth in referenced publication have been performed and the results required by design have been met.

D. Closeout Documents: At Substantial Completion submit to the OAR two CD’s and one hard copy of the documents indicated in paragraphs 1 through 5 below:

1. Maintenance Log: Provide Microsoft Excel Spreadsheet including the following information:
    a. Maintenance log and upkeep records of the installed Post Construction BMPs. Include the following headers as a minimum: “Date of Service”, “Location of BMP”, “Type of Maintenance or Service”, “Notes”, “Next Scheduled Preventive Maintenance Due”, and “Inspector Signature.”
    b. Maintenance Requirements: Include the following headers as a minimum: “BMP Description”, “Location of BMP and Map Grid Location” and “Type of Maintenance or Service needed”, i.e.;

weekly, monthly, quarterly, etcetera. “Stock No.”, “Manufacturer Contact Information”, along with “Frequency” namely: weekly, monthly, quarterly, etcetera and “Special Instructions”.

2. Maintenance Manuals: Provide Maintenance Manual for storm drainage BMP components installed along with requirements, replacement or maintenance schedule and plans with the location of each BMP component. This manual shall include product information cut sheet, shop drawings, vendor information for each component and warranty.
3. Record drawings: ‘As-Builts’ site plan(s) showing Post Construction BMP. Provide a copy of marked record set with red pencil identifying any variations from design documents.

4. Training Documentation:

    a. OWNER attendees sign off training sheet

    b. Two DVD’s of materials covered in the training and components installed.

1.6 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

1.7 DELIVERY, STORAGE AND HANDLING.

A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle all products according to manufacturer's written rigging instructions.

1.8 TRAINING OF OWNER PERSONNEL

A. At Substantial Completion and when the storm drainage system is fully operational, knowledgeable representatives from the CONTRACTOR and manufacturer(s) of the components specified and installed at the site shall provide up to 8 hours of training. Date, time and location for the training shall be coordinated through the project OAR. Have OWNER attendees sign off training sheet and provide a copy to the OAR.

B. Training period shall cover but not be limited to the following:

    1. Explain the operation of storm drainage system and its design intent.
    2. Explain the maintenance requirements of every component of the system.
    3. Provide recommendations of practices to minimize or eliminate negative impact on the system.

4. Provide maintenance schedule as recommended by the manufacturers for every component and review it with OWNER's Maintenance and Operations staff.
5. Conduct a site walk, identify every component of the system and demonstrate its operation.
6. Training shall be conducted with the use of Maintenance log and Maintenance manual.

1.9 SURPLUS MATERIALS

A. Provide enough additional materials for each component of BMP that requires replacement or service during the first year.

PART II – MATERIALS

2.1 PIPING MATERIALS

A. General: Minimum 5 feet away from building boundaries. For piping within 5 feet from building boundaries, and interior piping refer to Division 22 plumbing sections. Provide piping system in conformance with Section 207 - Pipe and Section 208 - Pipe Joint Types and Materials of the Standard Specifications for Public Works Construction. All Soil-tight pipes shall be provided with joints that are function of opening size, channel length, and backfill particle size. A backfill material containing a high percentage of fine-graded soils requires investigation for the specific type of joint to be used to guard against soil infiltration, including the requirement for fabric-wrapped joints.

B. Nonreinforced Concrete Pipe (CP): ASTM C14, with bell-and-spigot ends and gasketed joints with ASTM C443 rubber gaskets.

C. Reinforced Concrete Pipe (RCP): ASTM C76, with bell-and-spigot ends and gasketed joints with ASTM C443 rubber gaskets.

D. Cast Iron Soil Pipe (CIP):

1. Hubless, service weight, ASTM A888, CISPI 301, conforming to CISPI 310 and installed in accordance to IAPMO IS 6.
2. Cast iron soil coupling: Hubless, heavy-duty with neoprene gaskets, stainless steel corrugated shields, and 4 bands of stainless-steel clamps. IAPMO, ASTM C564 and CISPI 310.
3. Approved manufacturers: American Foundry, Mission Rubber Company, Tyler, or equal.

E. Corrugated, Dual Wall, High Density Polyethylene Drainage Pipe (HDPE):

1. Corrugated PE Drainage Pipe and Fittings NPS 4 to NPS 10: AASHTO M 252, Type S (double-wall) with smooth waterway for coupling joints.
2. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294

or ASTM F2306, Type S (double-wall) with smooth waterway for coupling joints.
3. Approved manufacturer: ADS, Hancor, JM Eagle, or equal.

F. Corrugated, Dual or Triple Wall, Polypropylene Pipe (PP):

1. Corrugated PP Drainage Pipe and Fittings NPS 12 to NPS 60: ASTM F2764, ASTM F2881, or AASHTO M 330, Type S (double-wall) or Type D (triple-wall), for respective diameters. Provide coupling joints with smooth waterway.
2. Approved manufacturers: ADS, Prinsco, or equal.

G. PVC (Poly Vinyl Chloride) Schedule 40 DWV Pipe:

1. Conform to ASTM D2665, ASTM F794, and ASTM F1866.
2. Installer of PVC Schedule 40 DWV piping system shall carry ASTM D2855 and ASME B31.3 qualification. Installer shall provide proof of these qualifications to IOR prior to commencing work.
3. Containers for solvent and primer shall be clearly marked with manufacturer's data. Solvent and primer shall not be more than one year old. The safety placards must be visible.
4. Blue or red-hot glue shall not be used.
5. Approved manufacturers and products:
    a. Pipe: Charlotte pipe and foundry, Harvel Plastics Inc., JM Eagle, Spears Manufacturing Company, or equal.
    b. Primer: Weld-On P-70 by IPS, Conforming to ASTM F656.
    c. Cement: Weld-On 711 (gray) by IPS, Conforming to ASTM D2564.

H. PVC (Poly Vinyl Chloride) SDR-35 Pipe, 6” through 15”:

1. Conform to ASTM D3034.
2. Gasketed Joints: Elastomeric gasket joints conforming to ASTM D3212.
3. Gaskets: Chloroprene conforming to ASTM F477.
4. Approved manufacturers: Charlotte pipe and foundry, Harvel Plastics Inc., JM Eagle, Spears Manufacturing Company, or equal.

2.2 BEDDING MATERIAL FOR PIPE

A. General: Conform to the requirements of Section 31 2313 - Excavation and Fill or Section 31 2323 - Excavation and Fill for Utilities, as required.

B. Approved manufacturers and products:

1. Propex Fabrics, Inc.: Geotex 451.

2. TenCate Geosynthetics Americas: Mirafi 140N.
3. US Fabrics, Inc.: 120NW.
4. Equal products.

2.3 PERFORATED SUBSURFACE DRAIN PIPE

A. Shop-perforated with perforations symmetrically located within a maximum arc of 160 degrees. Perforations shall provide a total open area of at least 0.3 square inches per linear foot of pipe, with a minimum of one perforation per linear foot, except for joint areas. Perforation shall be either holes or slots. Hole diameters of ¼ inch minimum to 3/8 inch maximum. Width of slots of 3/16 inch minimum to 5/16 inch maximum with slot length not exceeding 4 inches.

B. Aggregate Around Perforated Pipe shall be 6 inches of gravel containing no particles finer than a 3/8-inch to 1/2-inch sieve opening size.

2.4 STORMWATER TREATMENT SYSTEMS /BMPS

A. DET-1: Proprietary Detention BMPs – Reinforced Precast Concrete, approved manufacturers and products:

1. Jensen Precast: Precast-Concrete-Detention-Reservoir.
2. Oldcastle Precast Inc.: Storm Capture-Detention.
3. Storm Trap: Single-Trap-Detention.
4. Equal products.

B. FILT-2: Cartridge Media Filters, approved manufacturers and products:

1. Baysaver Technologies Inc.: Bayfilter.
2. Contech: Storm Filter.
3. OldCastle Precast Inc.: Perk Filter.
4. Equal products.

C. GS-1: Hydrodynamic Separation Devices, approved manufacturers and products:

1. ADS-Baysaver Technologies Inc.: Barracuda S Series.
2. Contech: CDS.
3. Hydro International: First Defense HC (High Capacity.
4. Jensen Precast: JDS.
5. Oldcastle Precast Inc.: DVS
6. Equal products

D. GS-2: Catch Basin Inserts, approved manufacturers and products:

1. AbTech Industries: UUF DI-DO.
2. ADS-FlexStorm: FlexStorm Pure or Catch-it.
3. Aquashield Inc.: Aqua-Guardian.
4. Ecosense International: EcoSense International’s Catch Basin Insert.
5. Oldcastle Precast Inc.: FLoGard, or GISB.

6. UltraTech International Inc.: Ultra-Drain Guard.
7. Equal products

E. GS-3: Downspout Filters, approved manufacturers and products:

1. Oldcastle Precast Inc.: FLoGard +Plus.
2. Equal products

F. GS-5: Stormwater Interceptors, approved manufacturers and products:

1. Jensen Precast: JPHV-stormwater-interceptors-with-bypass.
2. Oldcastle Precast Inc.: Storm Capture Detention.
3. Oldcastle Precast Inc.: NSBB, Nutrient Separating Baffle Box.
4. Storm Trap: Single-Trap-Detention.
5. Equal products.

G. RET-4: Drywells

1. Pre-Cast Liner: Reinforced 4000 PSI concrete. 48” I.D., 54” O.D.
2. Overflow/Riser Pipe: Minimum 6” I.D. Schedule 40 Poly Vinyl Chloride (PVC) solid wall with debris shield.
3. Drainage Screen: Minimum 6” I.D., Schedule 40 PVC slotted screen with 0.120-inch slots continuous, with a minimum of 160 slots per foot.
4. Rock: Clean washed rock uniformly graded between 3/8” and 1-1/2”.
5. Absorbent: Hydrophobic petrochemical sponge with minimum four (4) quart capacity used in all chambers.
6. Approved manufacturers and products:
    a. Torrent Resources: MaxWell.
    b. Equal products.

H. RET-7a: Proprietary Retention/Infiltration BMPs – Polypropylene or Polyethylene

1. Molded PP or PE with open bottom. Thermoplastic Corrugated Wall Chambers (Chambers): Provide in conformance with ASTM F 2418 “Standard Specification for Polypropylene Corrugated Wall Stormwater Collection Chambers”, ASTM F 2922 “Standard Specification for Polyethylene Corrugated Wall Stormwater Collection Chambers”, and ASTM F 2787 “Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers.
2. Filtering Material: ASTM.D448, washed, crushed stone or ¾” to 2” gravel. For more information refer to plans, and manufacturer installation manual.
3. Filter Mat, applicable to isolator/main row: Geotextile woven or spun filter fabric, in one or more layers. For more information refer to plans, and manufacturer installation manual.
4. Provide non-woven geotextile fabric around the entire system to prevent migration of fines into the rock voids. For more information refer to plans,

and manufacturer installation manual.

5. Pipe Systems: Perforated manifold, header, and lateral piping complying with AASHTO M 252 for NPS 10 and smaller, AASHTO M 294 for NPS 12 to NPS 60. Include proprietary fittings, couplings, seals, and filter fabric.
6. Approved manufacturers and products:
    a. ADS - Storm Tech: MC3500, MC4500, SC740 or DC780.
    b. Contech: ChamberMaxx.
    c. NDS: StormChambers SC34 or SC44.
    d. Prinsco: HydroStor HS180 or HS75.
    e. Triton: S22 or S29.
    f. Equal products.

C. RET-7b: Proprietary Retention/Infiltration BMPs – Reinforced Precast Concrete, approved manufacturers and products:

1. Jensen Precast: Precast-Concrete-Arches.
2. Oldcastle Precast Inc.: Storm Capture Infiltration.
3. StormTrap: Single-Trap-Infiltration.
4. Equal products.

D. VEG-6: Proprietary Biotreatment Devices, approved manufacturers and products:

1. BioClean: Modular Wetlands System.
    a. Infiltration media shall be ARCOSA
2. Contech: Filterra Bioretention Systems.
    a. Infiltration media shall be Filterra Media consist of a combination of natural sand, gravel, and organic materials.
3. DeepRoot Urban Landscape: Silva Cell 2.
4. Oldcastle: BioPod Underground
    a. Infiltration media shall be StormMix.
5. Oldcastle: BioPod Underground

2.5 MISCELLANEOUS MATERIALS

A. Metal Covers, Grates, Frames and Accessories:

1. Conform to Section 206 - Miscellaneous Metal Items of the Standard Specifications for Public Works Construction.
2. Hot-dip galvanize steel parts after fabrication in accordance with Section 210 - Paint and Protective Coatings of the Standard Specifications for Public Works Construction. Grates and Frames:
    a. Vandal-proof design and construction.
    b. ADA compliant, in conformance to CBC 11B-302.3.

c. Rated for vehicular traffic on areas intended for use by motor vehicles.
d. Hot-dip galvanized.

B. Concrete, Mortar and Related Materials: Conform to Section 32 1313 - Site Concrete Work.

C. Manhole Brick Mortar, Grout, and Plaster: Conform to Standard Specifications for Public Works Construction, Section 202 - Masonry Materials.

D. Underground Concrete Structures: Shall be precast and rated for H-20 traffic loading and applicable soil loads. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.

2.6 NAMEPLATES

A. Stainless steel or aluminium nameplate permanently fastened to BMP showing the following information:
1. BMP ID number and BMP type.
2. Next service day followed by a 1-inch by 4-inch long blank space.
3. Manufacturer name, model number, telephone number and stock ID number.
4. Installation or production date.
5. 1-inch by 4-inch blank space for OWNER’s use.

PART III - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. CONTRACTOR shall arrange for a preconstruction meeting with the manufacturer’s representative to review the basic principles for proper installation of Underground BMP type products prior to any installation.

6. Underground Concrete modules shall be installed in accordance with manufacturer’s instructions and the current ASTM C891 procedures.

3.2 EXCAVATION, BACKFILLING AND COMPACTING

A. Conform to the requirements of Section 31 2313 - Excavation and Fill or Section 31 2323 - Excavation and Fill for Utilities, as required.

3.3 INSTALLATION OF PIPE

A. Conform to Section 306 - Underground Conduit Construction of the Standard Specifications for Public Works Construction.

B. Non-ferrous drainpipe installed with less than 12 inches of cover to finish grade shall be provided with a 4-inch thick concrete pipe encasement.

3.4 DRAINANGE APPURTENCES

A. Catch basins, junction chambers, manholes, box culverts, outlet chambers and other drainage structures: Construct as indicated on Drawings and as specified in Section 32 1313 - Site Concrete Work, and in compliance with the Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction.

B. Ensure that Post Construction BMP have a visible identifying manufacturer tag with product identification, manufacturer contact information, date of last service and date of next service due.

C. Provide storm drain stencil per City or County requirements as applicable.

3.5 STORMWATER TREATMENT SYSTEMS/BMPs

A. Shall be completed by design team.)

B. RET-4: Drywells

1. The drilled holes shall be the diameter shown on the plans. The holes shall be drilled in a manner to maintain maximum permeability of soils.
2. The drainage pipe, drainage screen, and filter fabric sleeve shall be suspended during backfilling operations. The drainage pipe shall extend to within 2 feet of the total depth of the drywell. The rock backfill shall be placed to prevent buckling and breakage of the drainage pipe, screen, and filter fabric.
3. The overflow/riser pipe shall be installed within the drywell chamber to create a sump with depth per project detail (6’ minimum).
4. The pre-cast liner shall be centered in drilled shaft and the sections carefully aligned to maximize the bearing surfaces of the liner walls.
5. The ring and grate shall be set to the rim elevation shown on the plans or to match existing grades and shall be secured to the cone with mortar.
6. Upon completion of each drywell, a lay of UV stabilized Mirafi® 100X fabric shall be placed over the grated inlet and banded in place. The fabric shall not be removed until after paving the landscaping operations are completed.

3.6 ABANDONED DRAINAGE LINES AND STRUCTURES

A. Cap or plug existing drain lines that are cut and abandoned and remove existing drainage structures that are abandoned.

3.7 CLOSED-CIRCUIT TELEVISION INSPECTION

A. Coordinate with OAR time and date of inspection. Project Inspector shall be

present during the CCTV inspection.

B. Clean laterals by hydraulic jet.

C. Perform internal closed-circuit television inspection of lateral from the building to the public mainline. Record drain line in its entirety with no breaks or interruptions. Move camera at a speed no greater than 30 feet per minute, stopping for a minimum of ten seconds to record pipe connections, defects, and points of interest.

D. Maintain technical quality, sharp focus and distortion free picture. Pan, tilt, and rotate as necessary to best view and evaluate connections, defects and points of interest.

E. Minimum Requirements for Closed-circuit Television Equipment:

1. Television camera specially designed for pipe inspections, and operative in 100 percent humidity conditions.
2. Camera and television monitor capable of producing minimum 470H-line resolution color video picture.
3. Camera capable to inspect lines as small as three inches up to 70 feet from storm drain mainline.
4. Camera lighting shall be suitable to allow clear picture of inner wall at least ten feet in front.

F. Defective Work:

1. New Lines: Defective Work found shall be repaired at CONTRACTOR's expense. Perform a new closed-circuit television inspection at no cost to OWNER.
2. Existing Laterals
   a. If roots, sludge, or sediment material or other defect not related to the Work of this project impedes inspection, withdraw camera, restart inspection from opposite end and notify OAR of defects found.
   b. If obstruction or stoppage was caused by Work related to this project, remove obstruction at no cost to OWNER. Perform a new closed-circuit television inspection at CONTRACTOR's expense.

3.8 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

B. Maintain Post Construction BMP after installation and keep a maintenance log to be turned over to OAR at Substantial Completion.

3.9 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 01 78 00

WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Warranties: Compile required, and incidental warranties required by Contract Documents.

1. Manufacturer Warranties: Provide manufacturer's standard warranties where specified including inspections and services included or required as part of manufacturer's standard warranty.

2. Special Warranties: Provide special warranties as required by Specifications sections.

3. These warranties shall be in addition to and not a limitation of other rights Owner may have against Contractor under Contract Documents and which may be prescribed by law, regardless of wording of warranty.

B. Extended Correction Period: Contractor shall correct failure of materials and systems to perform in a manner consistent with their intended use including but not limited to failure of waterproofing and roofing systems to resist penetration from water.

1. Standard Correction Period: One year after Substantial Completion or Beneficial Occupancy by Owner except where otherwise noted in Contract Documents; coordinate with General Conditions and Supplementary Conditions.

a. Items used by Contractor during construction operations shall not be considered substantially completed.

b. Correction of Work Period begins with Owner occupancy not completion of component.

2. Extended Correction Period: Requirements are same as standard correction period but for an extended period as indicated in Specifications sections.

3. Contractor Responsibilities: Bear cost of correcting failed work and replacing construction damaged by failure of materials and systems to perform in a manner consistent with their intended use during correction period.

a. Requirements for correction period shall apply to Subcontractors, suppliers, installers, and those responsible for failed work.

b. Owner and Design Team shall not be responsible for determining degree of responsibility of those involved.

4. Owner's Rights under Law: Correction period shall be in addition to and not a limitation of other rights Owner may have against Contractor under Contract Documents and which may be prescribed by law.

1.2 FORM OF SUBMITTAL

A. Special Warranty and Extended Correction Period Forms: Provide duplicate copies, notarized or on Contractor and Manufacturer's letterhead without conditions or exceptions to requirements specified.

1. Assemble documents executed by subcontractors, installers, suppliers, and manufacturers.

2. Provide table of contents and assemble in binder with durable plastic cover, clearly identified regarding extent of contents.

3. Electronic Format: Submit USB 3.0 flash drives of warranties, in Microsoft Word.

B. Manufacturer Warranty Forms: Use manufacturer’s standard forms unless otherwise directed in Contract Documents; completed form shall not detract from or confuse interpretations of Contract Documents.

1. Manufacturer’s authorized representative shall sign manufacturer warranties.

2. Subcontractor and installer shall countersign warranty where specified.

a. Provide required warranties for waterproofing and roofing systems countersigned by subcontractor and installer.

C. Submit final warranties prior to final application for payment.

1. For equipment put into use with Owner's permission during construction, submit within ten days after first operation.

2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

D. Provide information for Owner's personnel regarding proper procedure in case of failure and instances that might affect validity of manufacturer warranty.

E. Size: 8-1/2" by 11" for three-ring binder; fold larger sheets to fit.

1.3 WARRANTIES AND CORRECTION OF WORK DOCUMENTS

A. Warranties and Correction of Work Documents are intended to protect Owner against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.

B. Limitations: Warranties and correction of work requirements are not intended to cover failures that result from:

1. Unusual or abnormal phenomena of the elements.

2. Owner's misuse, maltreatment or improper maintenance of work.

3. Vandalism after substantial completion.

4. Insurrection or acts of aggression including war.

C. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of work.

D. Reinstatement: After correction of work reinstate warranty or extended correction period for corrected work to date of original expiration, but not less than half original period.

1. Correction of Work Period: The general correction of work period specified shall not be extended by corrective work except to extent required to correct failure and repair or replace materials damaged by failure.

E. Replacement Cost: Replace or restore failing items without regard to anticipated useful service lives where part of correction of work period, extended correction of work period, and special warranty period unless otherwise noted.

F. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse interpretations of Contract Documents.

END OF SECTION

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide equipment and systems demonstration and instruction in accordance with Contract Documents.

1. Video record seminars and system demonstrations.

B. Related Sections:

1. Section 01 31 00: Project management and coordination.
2. Section 01 77 00: Contract closeout procedures.
3. Refer to Facility Services Subgroups for mechanical and electrical requirements.

1.2 DESCRIPTION

A. Seminar Agenda and Outline:

1. Prepare a seminar agenda and outline in consultation and cooperation with Owner. Include following:

a. Equipment and systems that will be included in seminars.
b. Name of companies and representatives presenting at seminars.
c. Outline of each seminar's content.
d. Time and date allocated to each system and item of equipment.

2. Submit preliminary seminar agenda and outline for review and comment by Owner.

a. Revise and resubmit agenda and outline until all seminar requirements have been satisfied and seminar dates and presenters have been finalized.

3. Submit final seminar agenda and outline no later than eight weeks before date of Acceptance of Work.

B. Seminar Organization:

1. Contractor’s presentation leaders shall chair seminars.

a. Coordinate qualification of training personnel, seminar contents, and presentations with Owner.

2. Coordinate individual presentations and ensure manufacturer’s representatives scheduled to be at training seminars are present.

3. Arrange for presentation leaders familiar with design operation, maintenance and troubleshooting of equipment and systems.

    a. Where one person is not familiar with all aspects of equipment or system; arrange for specialists familiar with each aspect.

4. Coordinate proposed seminar dates with Owner and select mutually agreeable dates.

5. Video Recording: Arrange for video recording (audio and video) of training seminars and system demonstrations, including seminar and demonstration questions and answers.

C. Seminar Content:

1. Architect’s Consultants will explain design philosophy of primary systems.

2. Include following information in presentations dealing with specific systems.

    a. An overview of how system is intended to operate.
    b. Describe design parameters, constrains and operational requirements.
    c. Describe system operation strategies.
    d. Provide information to help in identifying and troubleshooting problems.

3. Include following information in presentations dealing with equipment.

    a. Explanation of how equipment operates.
    b. Recommended preventative and routine maintenance.

D. System Demonstration:

1. Demonstrate operation of equipment and systems when specified in individual technical sections. Include following in demonstration.

    a. Start-up and shut down.
    c. Operation.
    d. Scheduled and preventative maintenance.
    e. Troubleshooting.

2. Demonstration may be conducted at time of original starting with Owner's prior approval.

E. Seminar and Demonstration Questions:

1. Be prepared to answer questions raised by Owner’s personnel at demonstrations and seminars.

2. If unable to satisfactorily answer questions immediately, provide written response within three days.

F. Use manufacturer’s operation and maintenance data as basis of instruction.

1.3 SUBMITTALS

A. Video Recording: Submit three copies of each video recording in DVD format acceptable to Owner; include label on each DVD and on each container identifying Project and Seminar content.

END OF SECTION

SECTION 02 41 20

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Selectively remove materials, systems, components, fixtures and equipment as designated and as required for completion of Project as indicated.

1. Cap and identify active utilities.

B. Related Sections:

1. Section 01 10 00: Summary of work including hazardous materials requirements.
2. Section 01 50 00: Temporary facilities including barriers and waste management.
3. Section 01 73 00: Cutting and patching.
4. Section 02 41 10: Structure demolition.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Do not interfere with use of adjacent building spaces not in Project; maintain free and safe passage to and from.

2. Prevent movement of structural components, provide and place bracing and be responsible for safety and support of structural components. Assume liability for movement, settlement, damage or injury.

3. Cease operations and notify Architect immediately if safety of structural components appears to be endangered; take precautions to properly support structures. Do not resume operations until safety is restored.

4. Prevent dust from selective demolition from contaminating adjacent occupied building areas; clean construction dust from adjacent occupied area immediately upon direction of Building Manager.

B. Design/Build: Provide special engineering to ensure compliance with applicable codes and Contract Documents for support systems.

C. Scheduling: Do not close or obstruct roadways without permits. Conduct operations with minimum interference to adjacent traffic.

1.3 SUBMITTALS

A. Action Submittals: Submit selective demolition operational sequence to ensure Project sequencing is consistent with Owner needs.

B. Informational Submittals: Submit permits for transport and disposal of debris.

1.4 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with *CAL*Green requirements including those relative to finish material pollution control and for construction waste.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Debris: Maintain possession of materials being demolished except where noted as a material for reinstallation or a material to be retained by Owner. Immediately remove debris from site.

1. Immediately remove from site wet materials and materials with water stains, with mold, and with mildew.

B. Materials for Reinstallation: Carefully remove, store and protect materials indicated to be reinstalled. Contact Owner and Architect prior to beginning demolition to determine extent of other materials that might be suitable for reinstallation.

1. Inventory and record condition of items to be reinstalled.

C. Owner Retained Materials: Contact Owner prior to beginning demolition to determine extent of materials to be retained. Carefully remove materials indicated to be retained by Owner; deliver and store where directed.

1. Inventory and record condition of items to be retained by Owner.

PART 3 - EXECUTION

3.1 EXISTING SERVICES

A. Disconnect or remove utility services as required for completion of Project; disconnect, stub off, and cap utility service lines not required for new construction.

1. Do not remove utilities discovered during demolition but not indicated without first determining purpose for utility; coordinate with Architect and Engineers.

B. Do not disrupt services to adjacent building areas not in Project.

C. Place markers to indicate location of disconnected services; identify service lines and capping locations on Project Record Documents.

3.2 DEMOLITION

A. Demolish indicated appurtenances as indicated and as required for Project completion in an orderly and careful manner.

1. Use methods that do not damage materials indicated to remain.

2. Cut concrete and masonry using masonry saws and hand tools; provide sharp clean cuts requiring minimal patching for new construction.

3. Use impact tools only where specifically approved in advance for areas where operations do not disturb building occupancy.

B. Perform demolition in accordance with authorities having jurisdiction.

C. Remove demolished materials from site, unless otherwise directed.

1. Remove from site, contaminated, vermin infested, and dangerous materials encountered and dispose of by safe means so as not to endanger health of workers or public.

D. Remove tools and equipment upon completion of work; leave area in condition acceptable to Owner and Architect.

3.3 REPAIR

A. Repair damage to adjacent construction caused as result of this work.

B. Repair demolition beyond that required.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing, and anchorage.

B. Openings for other affected work.

C. Form accessories.

D. Stripping forms.

1.2 REFERENCES

A. 2019 CBC – California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Chapter 19A.

B. ACI 301 - Specifications for Structural Concrete for Buildings.

C. PS-1 - Construction and Industrial Plywood.

1.3 SYSTEM DESCRIPTION

A. Design, engineer, and construct formwork, shoring, and bracing to meet design and code requirements, so that resultant concrete conforms to required shapes, lines, and dimensions.

1.4 QUALITY ASSURANCE

A. Construct and erect concrete formwork in accordance with ACI 301.

1.5 REGULATORY REQUIREMENTS

A. Conform to CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Plywood: PS-1, BB Plyform grade, Class I, Exterior classification.

B. Lumber: Douglas Fir species; construction grade; with grade stamp clearly visible.

C. Tubular Column: Round, of spirally wound laminated fiber; surface treated with release agent; of

2.2 FORMWORK ACCESSORIES

A. Form Ties: Snap-off metal of adjustable length; cone type; 1 inch break back dimension; free of defects that will leave holes no larger than one inch diameter in concrete surface.

B. Form Release Agent: Colorless material which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

C. Fillets for Chamfered Corners: Wood strips type; 3/4 x 3/4 inch size; maximum possible lengths.

D. Dovetail Anchor Slots: Minimum 22 gage galvanized steel; foam filled; release tape sealed slots; bent tab anchors; securable to concrete formwork; manufactured by Heckmann Building Products Co., www.heckmannbuildingprods.com.

E. Flashing Reglets: 26 gage thick galvanized steel; longest possible lengths; release tape sealed slots; with alignment splines for joints; securable to concrete formwork; Type CO reglet manufactured by Fry Reglet www.fryreglet.com.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required; of strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify lines, levels, and measurements before proceeding with formwork.

3.2 PREPARATION

A. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.

B. Arrange and assemble formwork to permit stripping, so that concrete is not damaged during its removal.

C. Arrange forms to allow stripping without removal of principal shores, where required to remain in place.

3.3 ERECTION

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by construction loads.

C. Provide chamfer strips on external corners of walls**.**

D. Obtain approval before framing openings in structural members which are not indicated on Drawings.

E. Do not displace or damage vapor barrier placed by Section 03 30 00.

F. Construct formwork to maintain tolerances in accordance with ACI 301.

3.4 APPLICATION OF FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.

B. Do not apply form release agent where concrete surfaces are scheduled to receive applied coverings which may be affected by agent. Soak contact surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for work embedded in or passing through concrete.

B. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

C. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

3.6 FORM REMOVAL

A. Do not remove forms and bracing until concrete has sufficient strength to support its own weight and imposed loads.

B. Do not damage concrete surfaces during form removal.

C. Store reusable forms for exposed architectural concrete to prevent damage to contact surfaces.

3.7 CLEANING

A. Clean forms to remove foreign matter as erection proceeds.

B. Ensure that water and debris drain to exterior through clean-out ports.

3.8 EARTH FORMS

A. Construct wood edge strips at top sides of excavations as indicated on drawings.

B. Provide forms for footings and foundation walls wherever concrete cannot be placed against solid earth.

C. Remove loose dirt and debris from form area prior to concrete placement.

D. Concrete for foundations may be placed directly into neat excavations provided the foundation trench walls are stable as determined by the Architect (Structural Engineer) subject to the approval of the Division of the State Architect.

E. When earth formed foundations are used, the minimum formwork shown on the drawings is mandatory to insure clean excavations prior to and during concrete placement.

F. Provide 3-1/2 inch high starter wall for all concrete and masonry walls below grade.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel bars, welded steel wire fabric fabricated steel bar or rod mats for cast-in-place concrete.

B. Support chairs, bolsters, bar supports, and spacers, for supporting reinforcement.

1.2 REFERENCES

A. A. 2019 CBC California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Chapters 17A & 19A (ACI 318).

B. ACI 301 - Specifications for Structural Concrete for Buildings.

C. ACI 315 (SP-66) - Details and Detailing of Concrete Reinforcement.

D. ACI 318 - Building Code Requirements for Reinforced Concrete.

E. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.

F. ASTM A1064- Welded Steel Wire Fabric for Concrete Reinforcement.

G. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

H. ASTM A706 - Standard Specification for Low Alloy Steel Deformed Bars for Concrete Reinforcement.

I. AWS D1.4 - Structural Welding Code Reinforcing Steel.

J. CRSI - Manual of Practice.

K. CRSI - Placing Reinforcing Bars.

1.3 QUALITY ASSURANCE

A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice.

B. Conform to ACI 301 and ACI 315 (SP-66).

C. Conform to CBC California Building Code, (CCR) California Code of Regulations, Title 24, Part 2.

1.4 CERTIFICATES

A. Submit mill test certificates of supplied concrete reinforcing, indicating physical and chemical analysis.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcing Steel: ASTM A615, Grade 60. Billet-steel deformed bars, uncoated finish.

B. Welded Reinforcement: ASTM A706, Grade 60, deformed bars, unfinished.

C. Welded Steel Wire Fabric: ASTM A185 plain type; coiled rolls; uncoated finish.

D. Steel Wire: ASTM A82, plain, cold drawn steel.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete including load bearing pad on bottom to prevent vapor barrier puncture.

2.3 FABRICATION

A. Fabricate in accordance with ACI 315 (SP-66), providing concrete cover specified in Section 03 30 00.

B. Locate reinforcing splices not indicated on Drawings at points of minimum stress. Indicate location of splices on shop drawings.

C. Weld reinforcing bars in accordance with AWS D1.4.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Before placing concrete, clean reinforcement of foreign particles or coatings.

B. Place, support, and secure reinforcement against displacement. Do not deviate from alignment or measurement.

C. Do not displace or damage vapor barrier required by Section 03 30 00.

3.2 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01 40 00 and as required by the Division of the State Architect and District Inspector.

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END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Cast-in-place normal weight concrete, placement and finishing.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 32 13 13: Site Concrete Work.
3. Section 03 10 00: Concrete Forming and Accessories.
4. Section 03 20 00: Concrete Reinforcing.
5. Section 03 35 15: Sealed Concrete Flooring

1.2 REFERENCES:

A. 2019 CBC – California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Chapters 17A & 19A.

B. American Concrete Institute (ACI) Publication:

1. AC I - 224R-01 Control of Cracking in Concrete Structures.
2. AC I - 224.3R-2008 - Joints in Concrete.
3. AC I 301 - Structural Concrete for Buildings.
4. AC I 302.1R-04 - Guide for Concrete Floor and Slab Construction.
5. AC I 318-2014 - Building Code Requirements for Structural Concrete and Commentary

C. American Society for Testing and Materials (ASTM) Standards:

1. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
2. ASTM A706 - Low-Allow Steel Deformed Bars for Concrete Reinforcement.
3. ASTM E 1745 - Water Vapor Retarders Used In Contact with Soil or Granular Fill Under Concrete Slabs.
4. ASTM C33 - Concrete Aggregates.

5. ASTM C94 - Ready-Mixed Concrete.

6. ASTM C150 - Portland Cement.

7. ASTM C171 - Sheet Materials for Curing Concrete.

8. ASTM C856-04 - Practice for Petrographic Examination of Hardened Concrete.

9. ASTM E-96 - Water Vapor Transmission of Materials.

10. ASTM E1155 - Test for Determining Floor Flatness and Floor Levelness.

11. ASTM F1869 - Test Method for Measuring Moisture Vapor Emission.

12. ASTM F2170 - Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes.

13. ASTM C1028 Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.

D. SSPWC - Standard Specifications for Public Works Construction, Latest Edition.

1.3 SUBMITTALS:

A. Shop Drawings: Submit Shop Drawings only if requested by Architect or Structural Engineer of Record. Non-requested submittals will be returned not reviewed. Shop drawings shall indicate locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work.

B. Mix Design Data: Submit concrete mix designs as specified herein and in Article 2.02.

1. Submit name, address and telephone number of the concrete production facility which the contractor intends to engage to design the concrete mixes. Submit name and qualifications of the proposed concrete technologist.

2. Mix Design: Submit a concrete mix design for each strength and type of concrete indicated in the drawings or specified. Include water/cement ratio, source, size and amount of coarse aggregate and admixtures. Predict minimum compressive strength, maximum slump and air content percentage. Clearly indicate locations where each mix design will be used.

3. Test Reports: Submit copies of test reports showing that the proposed mixes produce concrete with the strengths and properties specified. Include tests for cement, aggregates and admixtures. Provide gradation analysis.

C. Material Samples: Submit Samples illustrating concrete finishes and hardeners, minimum 12-inch by 12-inch.

D. Certificates: Submit certification that each of the following conforms to the standards indicated.

1. Portland cement: ASTM C150.

2. Normal weight concrete aggregates: ASTM C33.

3. Aggregates: Submit evidence that the aggregate is not reactive in the presence of cement alkalis. In the absence of evidence, aggregate shall be tested per ASTM C289. If results of test are other than innocuous, aggregates shall be tested per ASTM C1567 as reported per ACI 318 as modified by CBC, Section 1903A.5.

4. Curing materials: ASTM C171.

E. Admixtures: Submit product data for proposed concrete admixtures.

1.4 QUALITY ASSURANCE:

A. Continuous inspection shall be provided at the batch plant and for transit-mixed concrete to run check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.

B. Inspection shall be performed by a representative of a testing laboratory selected by the Owner. Owner will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.

C. Contractor shall assist the testing laboratory in obtaining and handling samples at the project site and at the source of materials.

D. Continuous batch plant inspection requirement may be waived in accordance with CBC Section 1705A.3.3. Waiver shall be in writing, including DSA approval. When batch plant inspection is waived by DSA, the following requirements shall be met.

1. Approved inspector of the testing laboratory shall check the first batching at the start of work and furnish mix proportions to the licensed weight master.

2. Licensed weight master shall positively identify materials as to quantity and certify to each load by a ticket.

3. Tickets shall be transmitted to the Inspector by a truck driver with load identified thereon. The Inspector will not accept the load without a load ticket identifying the mix and will keep a daily record of placements, identifying each truck, its load and time of receipt and approximate location of deposit in the structure and will transmit a copy of the daily record to DSA.

4. At the end of the project, the weight master shall furnish an affidavit to DSA certifying that all concrete furnished conforms in every particular to proportions established by mix designs.

E. Special Inspections and Tests shall be in accordance with CBC Chapter 17A, Reinforcement and Anchor testing per CBC Section 1910A.5 and DSA 103 form.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.

B. Packaged materials shall bear the manufacturers and brand name label and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.

1.6 PROJECT CONDITIONS:

A. Cold Weather Requirements: Batching, mixing, delivering and placing of concrete in cold weather shall comply with the applicable requirements of ACI 306.1.

B. Hot Weather Requirements: Batching, mixing, delivering and placing of concrete in hot weather shall comply with the applicable requirements of ACI 305R.

C. Concrete temperature of freshly mixed concrete shall be determined per ASTM C1064.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Cement: ASTM C150. Portland Cement. Type(s) as indicated on drawings and soils report.

B. Aggregates: Conform to the following standards:

1. Normal weight concrete: ASTM C33.

2. Aggregate shall be tested for Potential Alkali Reactivity of Cement-Aggregate Combinations per ASTM C289.

3. Maximum size of aggregate shall be no larger than:

a. 1 inch.

C. Water: Water for concrete mixes, curing and cleaning shall be potable and free from deleterious matter.

D. Admixtures: Shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing concrete proportions in accordance with ACI 318, Section 3.6.

1. Admixtures containing chlorides or sulfides are not permitted.

2. Air-entraining admixtures shall comply with ASTM C260. Air-entrained admixtures shall not be used for floor slabs to receive steel trowel finish.

3. Admixtures for water reduction and setting time modification shall conform to ASTM C494.

4. Admixtures for producing flowing concrete shall conform to ASTM C1017.

5. Admixtures containing ASTM C845 expansive cements shall be compatible with the cement and produce no deleterious effects.

6. Silica fumes used as an admixture shall conform to ASTM C1240.

E. Reinforcement Fibers: Chop strands of alkali-resistant polypropylene or nylon fibers added to the concrete mix for protection against shrinkage cracks.

F. Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D1751.

G. Curing Paper: Shall conform to ASTM C171 and consist of two sheets of kraft paper cemented together with a bituminous material in which are embedded cords or strands of fiber running in both directions. The paper shall be light in color, shall be free of visible defects, with uniform appearance.

H. Floor Hardener: See Section: 03 35 15 Sealed Concrete Flooring

I. Underlayment: Two component latex underlayment for filling low spots in concrete for both interior and exterior applications, from featheredge to a maximum of 3/8 inch in thickness. Underlayment shall be non-shrink and suitable for repairing exposed concrete surfaces and for underlayment of carpet, resilient, tile and quarry floor coverings. La-O-Tex by TexRite, Underlay C, RS by Mer-Krete Systems, Underlayment 962 by C-Cure, or equal.

J. Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 8,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

2.2 CONCRETE MIX:

A. Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of California.

B. Strength of Concrete: Strengths and types of concretes shall be as indicated in the Drawings. Unless otherwise indicated or specified, concrete shall be provided with minimum 28-day strength of 4000 psi (f'c).

C. The required strength and durability of concrete shall be determined by compliance with the proportioning, testing, mixing and placing provisions of CBC Chapter 19A. Concrete mix shall meet the durability requirements of ACI 318, Chapters 19 & 26.

D. Concrete proportioning shall be determined on the basis of field experience and/or trial mixtures shall in accordance with CBC Sections 1903A, 1904A and ACI 318, Section 26.4. Proportions of materials shall provide workability and consistency to permit concrete to be placed readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding.

E. Ready-Mixed Concrete: Mix and deliver in accordance with requirements of ASTM C94.

PART 3 - EXECUTION

3.1 GENERAL:

A. Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.

B. Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the Inspector at least 24 hours before placing concrete; do not place concrete until inspected by the inspector of record.

C. Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the Architect and DSA.

3.2 TOLERANCES:

A. Concrete construction tolerances shall be as specified in ACI 117 and as modified herein.

B. Floor Flatness (F_F) and Floor Levelness (F_L) shall be as indicated below:

	Specified Overall Value		Minimum Local Value	
	F_F	F_L	F_F	F_L
Slabs on ground:	35	25	24	17

C. Refer to ACI 302.1R, Tables 8.1 and 8.2 Slab on Ground and Suspended

Flatness/Levelness Construction Guide, for recommended concrete placing and finishing methods.

D. Floor Flatness and Floor Levelness shall be tested in accordance to ASTM E1155. Floor measurements shall be made within 48 hours after slab installation, and shall precede removal of shores and forms.

3.3 PREPARATION:

A. Vapor Barrier: Before installation of screeds and slab reinforcement, install vapor barrier under slabs on grade, as indicated in the drawings.

1. Install in accordance to ASTM E1643.

2. Place vapor retarder sheeting with the longest dimension parallel with the direction of the concrete pour.

3. Laps or seams shall be overlapped 6 inches, or as recommended by manufacturer. Las and penetrations shall be sealed with the manufacturer's recommended tape and/or mastic.

4. Inspector will inspect and mark areas of damage and insufficient installation of the vapor barrier sufficiently in advance of concrete placement.

   a. Deficiencies shall be corrected before concrete is placed.

   b. Patch damaged areas with vapor barrier overlapping four sides 6 inches and adhering with tape.

B. Reglets and Rebates:

1. Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Coordinate dimensions and locations required with other related WorK.

2. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated.

3. Anchor Slots: Embedded anchor slots in concrete walls to receive masonry veneer shall be set vertically in forms, 24 inches maximum on centers measured horizontally. Anchor slots shall be No. 24 gage galvanized sheet steel with removable fiber filler to prevent seepage of cement in slot.

4. Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.

3.4 INSTALLATION:

A. Conveying and Placing:

1. Concrete shall be placed only under direct observation of the inspector of record. Do not place concrete outside of regular working hours, unless the Inspector has been notified at least 48 hours in advance.

2. Concrete shall be conveyed from mixer to location of final placement by methods that will prevent separation or loss of materials.

3. Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.

4. In placing concrete in columns, walls or thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.

5. Concrete shall be placed as a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.

6. Concrete shall be thoroughly consolidated by suitable means during placement, and shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms.

7. Where conditions make consolidation difficult or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.

B. Cold Weather:

1. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. All ground with which concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.

2. The temperature of concrete at the time of placement shall not be below the minimum temperatures given in Table 3.1 of ACI 306.1.

3. Concrete shall be maintained at a temperature of at least 50° F. for not less than 72 hours after placing or until it has thoroughly hardened. Cover concrete and provide sufficient heat as required. When necessary, aggregates shall be heated before mixing. Special precautions shall be taken for protection of transit-mixed concrete.

C. Hot Weather:

1. Concrete to be placed during hot weather shall comply with the requirements of ACI 318, Section 26.5.5.

2. Maintain concrete temperatures indicated in Table 2.1.5 of ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square feet of exposed concrete per hour.

3. Cool concrete using methods indicated in ACI 305R Appendix B.

4. Place and cure concrete as specified in ACI 305R Chapter 4.

D. Compaction and Screeding:

1. Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.

2. Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

E. Floating and Troweling:

1. When concrete has hydrated sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces shall receive at least 2 troweling operations with steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish.

2. For interior finish slabs, final troweling shall provide a hard, impervious, and non-slip surfaces, free from defects and blemishes. Finished surface shall be within tolerances indicated in Article 3.02. Avoid burnishing. Do not add cement or sand to absorb excess moisture.

   a. Floor of Walk-In Refrigerator: Finish as specified above, to a smooth finish.

   b. Floor of Gymnasium Locker Rooms: After floating, and while the surface is still plastic, provide a fine textured finish by drawing a fine fiber bristle broom uniformly over the surface in one direction only. Floors sloped for drainage should be brushed in the direction of flow.

3. Exterior Paving and Cement Walks: Finish as specified above, except surface shall be given a non-slip broom finish to match Sample reviewed by the Architect.

4. Vertical concrete surfaces shall be finished smooth and free from marks or other surface defects.

F. Curing:

1. Length of time, temperature and moisture conditions for curing concrete shall be in accordance with ACI 308R & ACI 318 Section 26.5.3.

2. Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing.

3. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting not later than 2 hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been installed.

4. Immediately after finishing, monolithic floor slabs shall be covered with curing paper. Paper shall be lapped 4 inches at joints and sealed with waterproof sealer. Edges shall be cemented to finish. Repair or replace paper damaged during construction operations.

G. Filling, Leveling and Patching:

1. Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.

2. Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.

H. Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

3.5 FINISHING:

A. Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.

B. Sacking: Exposed concrete curbs, walls, and other surfaces shall be sacked by an application of Portland cement grout, floated, and rubbed. Sacking shall not be performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day.

1. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete

sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously.

2. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.

C. Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been furnished, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. Such surfaces shall be thoroughly washed with clean water after sandblasting.

D. Abrasive: Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, and interior exposed concrete floors in shop buildings shall receive an abrasive finish.

E. Floor Hardener: Exposed interior concrete floors throughout shall be treated with floor hardener.

1. Protect adjacent surfaces. Clean surfaces to receive treatment in accordance with manufacturer's instructions, ensuring that all stains, oil, grease, form release agents, laitance, dust and dirt are removed prior to application.

2. Apply hardener in accordance with manufacturer’s instructions as soon as concrete is firm enough to work on after final troweling.

F. Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at the Project site and shall be composed of one volume of Portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry with sufficient water added to make mixture flow under its own weight. When grout is used as a dry pack concrete, add sufficient water to provide a stiff mixture, which can be molded into a sphere.

G. Broom Finish: Exterior stair treads and landings shall be provided with a non-slip broom finish in addition to abrasive finish specified.

H. Abrasive Stair Nosing: Nosing shall be installed according to manufacturers written recommendations.

3.6 EXPANSION AND CONSTRUCTION JOINTS:

A. Construction Joints: Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:

1. Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement.

2. A mix containing same proportion of sand and cement provided in concrete plus a

maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete.

3. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.

B. Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. Space approximately 20 feet apart, unless otherwise indicated. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8 inch thick, unless otherwise indicated.

C. Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

3.7 TESTING:

A. Molded Cylinder Tests:

1. Inspector or testing lab personnel will prepare cylinders and perform slump tests. Samples for concrete strength shall be taken in accordance to ASTM C172. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted.

2. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of three days, seven days, and 28 days. A strength test shall be the average of the compressive strength of two cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of f'c.

3. Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C31, and tested in accordance with ASTM C39.

B. Core Test: At request of the Architect, cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with CBC and ASTM C42.

1. Provide 4 inch diameter cores at representative places throughout the structure as designated by the Architect.

2. In general, provide sufficient cores to represent concrete placed with at least one core for each 4,000 square feet of building area, and at least 3 cores total for each Project.

3. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.

C. Concrete Consistency: Measure consistency according to ASTM C143. Test twice each day or partial day's run of the mixer.

D. Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, falls below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.

E. Air Content Testing: Measure in accordance to ASTM C173 or ASTM C231, for each composite sample taken in accordance to ASTM C172.

F. Defective Concrete:

1. Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened in a manner acceptable to the Architect and DSA.

2. Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced.

G. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, strength shall have a minimum f'c = 4,000 psi. Exposed concrete shall be provided with a hand trowel finish with radius corners and edges. Form and place concrete where necessary as described in Section 03 10 00 Concrete Forming and Accessories, and reinforced as described in Section 03 20 00 Concrete Reinforcing. Calcium chloride shall not be furnished in any concrete mix provided for the installation of underground electrical conduits. For concrete encasement of more than one conduit, furnish 3/4 inch maximum aggregate.

3.8 PROTECTION:

A. Protect the Work of this section until Substantial Completion. Utilize Skudo floor protection for areas with exposed concrete flooring.

3.9 CLEAN UP:

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 03 35 15

SEALED CONCRETE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide applied curing, hardener, sealer type curing compound to concrete flooring including preparation of concrete as required for complete installation.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene not less than one week prior to commencing applying hardener sealer at areas indicated to have a hardener sealed finish.

1. Require attendance of those directly affecting work of this Section.

2. Review concrete installation and coordinate required preparation.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for each type of material involved in curing, hardener, sealer for concrete.

B. Samples: Furnish sample panels of concrete with curing, hardener, sealer applied to half of surface; indicate which half has hardener sealer.

C. Maintenance Instructions: Provide written instructions for recommended periodic maintenance.

1.4 QUALITY ASSURANCE

A. Curing, Hardener, Sealer Installers: Firms with not less than five years successful experience applying specified curing, hardener, sealer and acceptable to system manufacturer.

B. Mock-Up: Erect minimum 100 square feet of concrete flooring with curing, hardener, sealer at location as approved. Approved mock-up may be incorporated into Project.

PART 2 - PRODUCTS

2.1 SYSTEM MANUFACTURERS

A. Nox-Crete Products Group (800.669.2738).

B. W.R. Meadows, Inc. (800.342.5976).

C. PROSOCO, Inc. (800.255.4255).

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide applied curing, hardener, sealer to concrete flooring.

B. Regulatory Requirements, VOC Emissions: Comply with applicable limitations for volatile organic compound (VOC) emissions for concrete sealing materials.

C. Accessibility Regulatory Requirements: Provide for assuring access for persons with disabilities in accordance with state and federal regulations for slip resistance.

1. California Regulations: Comply with California Building Standards Code.

2. Federal Regulations: Comply with Americans with Disabilities Act (ADA) Standards.

3. Slip-Resistant Hard Surfaces: Hard surface finishes to comply with requirements of authorities having jurisdiction for slip-resistant hard surfaces, including general code requirements and requirements for access for persons with disabilities.

D. Hardener, Sealer, Densifier: Provide water borne penetrating lithium silicate system designated by system manufacturer as hardener, sealer, densifier.

1. Basis of Design: Nox-Crete Products Group/Duro-Nox LS.

2. Basis of Design: W. R. Meadows, Inc./Liqui-Hard Ultra.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Ensure surfaces to receive hardener sealer are clean and well cured.

B. Do not commence work until surface conditions are within tolerances required for proper finishing based on manufacturer recommendations.

C. Start of work indicates acceptance of conditions.

3.2 PREPARATION

A. Clean concrete slab free from foreign matter and prepare concrete for sealing in accordance with system manufacturer recommendations.

3.3 INSTALLATION

A. Comply with curing, hardener, sealer manufacturer recommendations and application instructions for application of concrete hardener sealer densifier as required to match approved samples and mock-up.

3.4 PROTECTION

A. Comply with system manufacturer recommendations for protecting floors until ready for use. Keep surface dry for minimum 48 hours after application.

B. Do not permit traffic on floors with curing, hardener, sealer for at least 72 hours.

C. Protect floors with curing, hardener, sealer until Substantial Completion.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Furnish and Installation of structural framing members, complete in place with required bracing, weld washers, nuts, shims, anchor bolts, and baseplates as indicated on the Drawings and specified herein.

B. Related Sections: Miscellaneous metals, refer to Section 05 50 00

1.02 REFERENCE STANDARDS

A. Refer to the following for information regarding materials and installation methods necessary:

1. California Building Code (CBC) 2019, Chapters 22A and 35, as adopted by Title 24, and Chapter 7, Section 704 Protection of Structural Members.

   a. Refer to Drawings for details, design numbers, and ratings.

2. On-Site Welding Requirements, Title 24, Part 9, Articles 49 and 74.

3. American Society for Testing and Materials: Specifications A36, A53, A108, A123, A153, A307, A325, A370, A435, A490, A500, A501, A572, A653, A673, A780, A992, C1107, E23, F436, F959M F1554 AND F1852.

4. American Institute of Steel Construction (AISC) 360-16 & 341-16.

5. American Welding Society: AWS D1.1 and AWS D1.4

6. Steel Structures Painting Council (SSPC).

1.03 SUBMITTALS

A. Submit Shop and Erection Drawings Prior to Fabrication: Notify Architect 2 weeks minimum prior to submitting for review. Prepare erection drawings by State registered Structural Engineer. Show welded connections, lengths of welds, profiles, sizes, spacing and locations of members, attachments, anchorages, framed openings, size and type of fasteners, cambers and live loads. Contractor shall be responsible for reviewing and verifying all dimensions on shop Drawings.

1. Splices and Deviations: Splices will be permitted only where and as shown on Drawings. Deviations from design drawings desired or required by fabricator are to be indicated on shop drawings by providing a heavy line around the feature on which deviation approval is being requested, showing complete detail and describing deviation proposed. Provide detail with a note specifically requesting approval of deviation by fabricator. Deviations or changes shall not be made without the approval

of the Division of the State Architect, as a Change Order.

a. Refer to Section 01 30 00, Submittals, Paragraph 3.04A.2. (Revisions) Cost of such changes shall be borne by the Contractor.

B. Erection and Bracing Plan and Procedure: Refer to Section 1710, Title 8, California Code of Regulations. Employ a California State licensed Civil Engineer to prepare erection and bracing plan and erection procedure for structural steel including columns, beams, and girders, who will be responsible for compliance. Follow plan and procedure exactly. Maintain a copy at project site. Pay for costs involved.

C. Scrap collection and recycling plan: Contractor shall prepare and submit a scrap collection and recycling plan for all miscellaneous and structural steel.

1.04 QUALITY ASSURANCE

A. Tests and Inspections: Testing for steel shall be done in accordance with Title 24, Part 2, Section 1705A.2. Inspection shall be in accordance with Title 24, Part 2, Table 1705A.2.1.

B. If structural steel can be identified by heat or melt numbers and is accompanied by mill analysis and test reports (identified stock shall not be tested), testing shall be in accordance with Title 24, Part 2, Section 2202A.1 and 2205A.

C. If structural steel cannot be identified or its source is questionable, make not less than one tension and one bend test for each 5 tons or fraction thereof. Also, it shall be tested to meet minimum chemical and mechanical requirements of the ASTM standard appropriate for the steel specified for the structure, per Title 24, Part 2, Section 1705A.2.1.

D. Furnish test specimens from steel fabricator and take them under the direction of the Testing Agency. Machine each test specimen by Testing Agency to dimensions required by ASTM A370.

E. Have testing agency pick up test specimens and make required tests.

F. Costs of tests of identified stock will be paid for by Owner, unless tests fail to comply with the specifications, in which case the Owner will pay for testing, but backcharge the Contractor.

G. Complete a 4-sided inspection of steel. Such inspection shall be paid for by the Owner. The Inspector of structural steel which is not fabricated within 25 miles of the project site, shall also be paid for by the Owner, but the Contractor shall pay for travel expenses.

H. After fabrication and inspection, costs associated with re-inspection of defective or replaced materials shall be paid for by the Owner, but backcharged to the Contractor.

I. Provide labor, equipment and facilities necessary for moving and handling materials to be inspected.

J. Provide and pay for supervision by a registered Inspector of welding operations of frames with joints, including inspection for quality, penetration, and conformity of Drawings, and a report verifying that welding is adequate and was done in conformity of project requirements.

1. Visually inspect welds and have inspector present to approve welding and high strength bolting whether performed in fabricator's shop or at project site and inspect erection. Ensure testing laboratory compliance with regulations of the Division of the State Architect and certify in writing, upon completion of work, that welding and high strength bolting has been performed in accordance with Drawings and these Specifications. Inspect grouting of column base plates.

2. Have testing laboratory check bolt tightness on not less than 10 percent of bolts selected at random in each high strength bolt connection. Follow procedures of ASTM A325 and A490.

3. Inspect all complete penetration welds and partial penetration welds by ultrasonic or other approved nondestructive tests. Inspect first pass of multi-pass welds and groove welds.

4. Perform ultrasonic testing by specially trained, qualified technicians who operate equipment, examine welds and maintain a record of welds examined, defects found and disposition of each defect. Repair defective welds and retest.

5. Ultrasonically test welds at rate of 100 percent to establish welder qualifications. If rejectable defect rate is less than 5 percent, frequency may be reduced to 25 percent. If rate increases above 5 percent, continue 100 percent testing until rejectable defect rate again drops below 5 percent. Calculate percentages by individual welder.

6. Submit all preliminary, working and final documents required by subsection 1.04K.

7. Inspect all seam welds at HSS steel member.

K. Comply with California Building Code (CBC) Title 24, Part 2, Sections 2213A and 1705A.2.

L. Results of tests, together with identified copies of the Mill Analysis and inspection reports shall be submitted to the Division of the State Architect, and to the Architect and Structural Engineer. Arrange for continuous inspection of Shop and field welding in accordance with Title 24, Part 2 Sections 1704A, 1705A.2 and Table 1705A.2.1.

1.05 PROJECT CONDITIONS

A. Verify measurements, lines, grades, locations and details at project site. Conform to existing field conditions.

PART 2 - PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Structural Steel Members: Shall conform to the requirements of ASTM A6 and shall be fabricated according to AISC 360-16.

B. Structural plates, bars, etc., shall conform to ASTM 36 and ASTM 572, unless noted otherwise on drawings.

D. Tube members shall conform to ASTM A500, Grade B.

E. All welding shall be done using the shielded electric arc process by AWS certified welders using AWS D 5.1, E80 and E90 electrodes.

F. All welds used in primary members and connections in the lateral force systems shall be made with a filler metal that has a minimum Charpy V-notch toughness of 20 ft.-lbs. at minus 20 degrees F., as determined by AWS classification.

G. Continuous inspection is required for all field and shop welding by an Inspector approved by the Division of the State Architect.

H. Bolts shall conform to ASTM A325, unless noted otherwise.

I. Structural Steel Shop Drawings shall be reviewed by the Structural Engineer prior to fabrication.

K. Recycled Content – Provide products with an average recycled content of steel so postconsumer recycled content plus one-half of postconsumer content is not less than 50%

2.02 LIGHT STRUCTURAL STEEL

A. Standard specifications for Hot-Formed Welded and seamless Carbon Steel Structural Tubing, ASTM A500 Grade B.

2.03 WELDING ELECTRODES

A. Conform to AWS, Latest Edition, AWS 1.1.

1. Required strength of weld shall comply with CBC Title 24, Part 2, Section 1705A.2.5.

2.04 GALVANIZING

Galvanize all structural steel exposed to weather.

A. Provide hot-dip galvanizing in accordance with ASTM A123, Grade 90.

B. Field Galvanizing: Provide ZRC, or other approved.

2.05 PRIMER

A. Exterior Primer - Provide Tnemec 10-99, a zinc-chromate, or other approved. Primer shall have a VOC content of 100 g/l (0.83 lb/gal) or less when calculated according to 40 CRF 59, Subpart D (EPA method 24).

B. Interior Primer – Provide interior primer 734149X red oxide by Rodda Co., or equal. Primer shall have a VOC content of 100 g/l (0.83 lb/gal) or less when calculated according to 40 CRF 59, Subpart D (EPA method 24).

C. Clean, prepare and shop prime exterior members in accordance with SSPC-Paint 20 or SSPC-Paint 29 and compatible with top coats indicated on plans. Do not prime specific surfaces to be welded or which will be in direct contact with concrete or other cementitious materials.

D. Clean, prepare and shop prime interior members in accordance with SSPC-Paint 23 and compatible with topcoats indicated on plans. Do not prime specific surfaces to be welded or which will be in direct contact with concrete or other cementitious materials.

2.06 WELDED STUDS

A. All welded studs shall be Nelson shear connector studs complying with CBC 2213A.2 or having a valid third party evaluation service report (ICC, IAPMO, or equivalent) for the product under the governing code.

B. See Drawings for welded stud locations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Surface Conditions: Prior to commencing work of this section, inspect the work of others and verify that such work has been properly completed and installed to allow for proper installation of materials and methods required of this section.

3.02 FABRICATION AND ERECTION

A. Fabricate and assemble work by skilled workers using sizes and weights shown. Connections are to develop at least strengths shown, unless approved otherwise beforehand. Allow no splices except where shown.

1. Ultrasonic material inspection - ultrasonically test column materials thicker that 1-1/2 inch for laminations within 1 foot (6 inches either side) of a direct groove weld from girder flange connections and column splices.

B. Drilling, Punching and Reaming: Hole burning to make or enlarge previous holes is not allowed. Prepare required holes in structural steel members for attachment or passage of work of other trades. Where allowed, steel may be punched 1/16-inch larger than the nominal diameter of the bolt when thickness of the steel is equal to or less than the diameter of the bolt plus 1/8-inch. Where the steel is thicker than the diameter of the bolt plus 1/8-inch, the holes must be drilled or sub-punched and reamed. Diameter of the sub-punched holes, and the drill for sub-drilled holes, is to be 1/16-inch smaller than the nominal diameter of

bolt to be installed. Precisely locate finished holes to ensure passage of bolts through steel assemblies without drifting. Enlarge holes only by reaming. Poor matching of holes is cause for rejection of work.

C. Welding: Comply with the requirements of Title 24, Part 2, Sections 1705A.2.5 and DSA IR 17-3. Perform welding by the electric shielded arc process. Cut out defective welds with a chisel. Clamp or hold materials securely in position for welding. Upon completion, remove slag and clean welds for inspections and painting. Groove and multi-pass welds are required to be continuously inspected.

1. Storage and Care of Electrodes: Ensure that coatings of low hydrogen type electrodes are thoroughly dry when used. Use electrodes taken from hermetically sealed packages within four hours of the time the package is opened. Electrodes not used within this time period, and electrodes which have been exposed more than one hour to air having a relative humidity of 75 percent or greater, are to be dried for at least two (2) hours at 200 to 250 degrees F. before used, or are to be reconditioned according to manufacturer's printed recommendations. Electrodes dried or reconditioned, which are not used within four hours after drying is completed, are to be re-dried before use. Electrodes of any classifications that have been wet are not to be used under any conditions.

2. Preparation: Clean surfaces to be welded of paint, grease, scale, and foreign matter. Clean welds each time electrode is changed. Chip entire area of hand guided and controlled flame cut edges before welds are deposited. In general, surfaces made by automatic or mechanically guided and controlled equipment need not be ground or chipped before welded.

3. Procedures: During assembling and welding, hold components of a built-up member with sufficient clamps or other adequate means to keep parts straight and in close contact. Do no welding in wind until adequate protective screening has been set up.

4. Characteristics of Welds: After being deposited, brush welds and ensure they exhibit uniform section, smoothness of weld metal, feather edges without undercuts or overlays, and freedom from porosity and clinkers. Ensure through visual inspection at edges and ends of fillet welds there is good fusion and penetration into base metal.

D. Bolting:

1. Common Bolts: Make connections with ASTM A307 common bolts only where indicated.

2. High Strength Steel Bolting: Where structural joints are made using high strength bolts, load indicator washers, and nuts tightened to a high tension, the materials, method of installation and tension control, types of wrenches to be used, and inspection

methods are to conform to specifications for structural jointing using ASTM A325 or A490 bolts established by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation and the following requirements:

a. Provide high strength bolts with a suitable identifying mark placed on top of the head before leaving factory.

b. Do tightening of nuts with properly calibrated wrenches, load indicator washers, or turn of nut method; the minimum bolt tension for the size of bolt used is to be in accordance with tables listed in the above standards.

c. Check calibrated wrenches individually for accuracy at least twice daily for actual conditions of application.

d. Mark bolts that have been completely tightened with identifying symbol.

e. Install load indicator washers in accordance with AISC specifications and Contract Drawings.

f. Ensure that contact bearing surfaces and threads of bolted parts are free of scale, slag, and burrs which could prevent solid seating of parts.

g. Bolt lengths are to be grip plus 1-1/4 inch.

h. At moment connections perform welding prior to high-strength bolt tightening.

3. Load Indicator Washers: Provide as manufactured/ licensed by Cooper and Turner, or Bethlehem Steel. They may be used for field installation of high-strength bolts. These washers may not be substituted for any required washer, but may be used in conjunction with required washers. Tightening is to be in accordance with these specifications using high strength bolts. After sufficient bolts in a joint are snugged to draw the members into close contact, tightening should progress from the most rigid part to the free edges until the load indicators on bolts are closed to the required gap of 0.015 inches under bolt heads or 0.010 inches under the nuts. To prevent overtightening and damage to the bolts, do not completely close the gap.

4. Tension Set Bolts, Nuts, and Washers: Series F9t as manufactured by Cold Form Specialties or Bethlehem Steel, may also be used for field installation of high strength bolts. In multi-bolt joints, tighten nuts in stages, a little at a time, without breaking the spline in any one of them until the final stage, to minimize slackening of the installed bolts.

5. Inspection of high strength bolting shall comply with Title 24, Part 2, Sections 2213A.1 and 1705A.2.6.

6. Erector to touch-up all welds and bolts after inspection.

E. Erection:

1. Erect structural steel by professional riggers, using proper hoists and equipment, carefully planned and laid out so that cutting shall not be necessary. Erect the work plumb, square and true to line. Provide temporary bracing and guys where necessary to provide for loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation, and leave in place as long as necessary to safeguard parts of the work.

2. Temporary Connections: Securely bolt work to maintain the steel in proper position while bolting and welding is being performed. Align, plumb and level work prior to welding and final bolting.

3. Set column base plates in exact position as to alignment, level and elevation and support on steel wedges or equivalent until grout has properly set. Center of each base is to be true to the column center within 1/16-inch and adjusted to its elevation to 1/32-inch. Exactly level plates on both axes.

4. Sequence: Carry out the erection of steel in the proper sequence with the work of others. Frame, bed and anchor to concrete and related work in accordance with detailed drawings and setting diagrams.

5. Erection Tolerance: Follow AISC except as follows:

   a. Vertical dimensions measured from top of beams at their connections at any one column, not varying more than 1/4-inch plus or minus per story or, when accumulative from floor to floor, not exceeding 3/8-inch per story exclusive of column shortening due to dead load.

   b. Floor level is considered level if floor framing members on any one floor measured from top of column connections do not vary by more than 1-1/2 inch plus or minus.

   c. Plumb displacement center line of columns from established column line, no more than 1 inch toward or away from established center line.

   d. Horizontal dimension variances governed by column displacement.

6. Perform erection with suitable equipment, of adequate capacity and design with due regard for personnel and public safety and as not to deflect or stress members beyond reasonable limits. Maintain erection and temporary bracing plan at project site in accordance with Title 8, California Code of Regulations.

7. Damaged Members During Erection: Straighten or replace members which are bent, twisted or damaged as directed. If heating is required in straightening, perform heating by methods which ensure uniform

temperatures throughout entire member. When directed, remove members which are damaged to an extent impairing their appearance, strength or serviceability and replace with new members at no additional cost to Owner.

8. Anchor Bolt Rods: Provide with setting drawings and instructions. Verify position of bolts prior to delivery of steel; report errors or deviations for adjustment.

F. Erection Bracing: Provide erection bracing immediately upon erection of members and leave in place until members are braced by balance of building.

3.03 PROTECTION

A. Protection of Floors and Temporary Flooring:

1. Exercise caution to protect floor surfaces and adjacent work from damages. Do not overload floors. Provide only pneumatic mobile equipment with tires, for moving steel. Do not place steel members directly on concrete floors. Pads, timbers, or other materials for cushioning shall be used.

2. Provide necessary planking, scaffolding and temporary flooring in connection with erection of steel or support of erection machinery as part of the work. Conform use of temporary floors or steel deck to governing codes and regulations.

3. Temporarily tack weld steel deck to supports where used as a working platform. Distribute concentrated loads from welding machines or other heavy machinery by planking or other equivalent means. Replace steel deck damaged in using as working platform at no additional cost to Owner.

3.04 CLEANING

A. Shop Priming:

1. Clean surfaces according to SSPC and AISC recommendations, and apply specified primer to minimum 1.0 dry mil thickness. Ensure that primer is worked into joints.
2. Steel to be embedded into cementitious materials, permanently concealed steel surfaces, contact surfaces of high-strength bolted connections, and surfaces to receive fireproofing are not to be primed.

END OF SECTION

SECTION 05 30 00

METAL DECKING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section Includes:

1. Metal decking as indicated.
2. Shear connectors.

C. Related Sections:

1. Section 01 40 00: Testing and Inspection.
2. Section 05 12 00: Structural Steel
4. Section 07 60 00: Flashing and Sheet Metal.

D. Referenced Standards

1. Conform to current adopted reference standards by date of issue of the current code cycle and the Date of the Contract Documents.
2. 2019 CBC – California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Chapters 17A, 22A, and Section 2210A.
3. ASTM A36 - Specification for Structural Steel.
4. ASTM A 108 - Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.
5. ASTM A572 - Grade 50, Structural Steel.
6. ASTM A653/A653M-98 - Sheet Steel, Zinc-Coated (Galvanized) or Zinc - Iron Alloy Coated by the Hot- Dip Process.
7. ASTM A 1008 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
8. AWS D 1.1 - Structural Welding Code.
9. AWS D 1.3 - Structural Welding Code, Sheet Steel.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements: Compute properties of deck sections on basis of effective design width as limited by provisions of the AISI specifications. Provide no less than deck section properties specified, including section modulus and moment of inertia per foot of width.

B. Regulatory Requirements:

1. Requirements of Regulatory Agencies: Underwriters Laboratories Inc. (UL) approval for the decking when installed as a part of an assembly indicated on Drawings in which fire resistive construction ratings are required.

2. Work of this section shall be in accordance with CBC.

1.03 SUBMITTALS

A. Shop Drawings: Drawings, sections and details indicate type of decking, location, finish, gage of metal, arrangement of sheets, necessary fabrication to incorporate decking into the Work, and relationship to openings and flashing.

1.04 QUALITY ASSURANCE

A. General: Metal decking steel shall conform to requirements of strengths and properties of standards specified.

B. Qualifications of Welders: Properly certified for the type of Work involved in compliance with CBC requirements.

C. Continuous inspection of welding will be performed by a special inspector, approved by Structural Engineer to inspect the Work of this section. Refer to Section 01 40 00: Testing and Inspection.

D. Identification of metal decking steel shall conform to the standards specified in Section 01 40 00: Testing and Inspection.

1. Fabricator shall furnish sufficient evidence to the Architect attesting compliance with specified requirements.

2. Conform to CBC requirements. Unclassified or unidentified decking is not permitted. Furnish deck manufacturer's certified mill analyses and test reports for each heat covering decking having Fy of 33 Ksi or less. In addition, for decking having Fy greater than 33 Ksi, testing laboratory shall perform one tension and elongation test and one bend or flattening test for each gage.

E. Unidentifiable Steel: Steel which is not readily identifiable as to grade from markings and test records is not permitted to be provided as part of the Work of this section.

F. Payment For Tests and Inspections:

1. Owner shall pay inspection and testing costs of identifiable steel.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. BHP Steel Building Products, Inc.

B. Verco Manufacturing Co.

C. Epic Deck

D. Members of Steel Deck Institute (SDI).

2.02 MATERIALS

A. Metal Decking: Roll-formed sheets conforming to ASTM A653 Grade 50 minimum, with G90 zinc coating.

1. Section properties shall conform to applicable provisions of latest edition of AISI - Specification for the Design of Cold-Formed Steel Structural Members.

2. Provide acoustical decking where noted on the architectural and structural drawings.

B. Flexible Closure Strips for Deck: Vulcanized, closed-cell, expanded chloroprene elastomer, complying with ASTM D 1056, Grade SCE #41.

1. Brittleness Temperature: Minus 40 degrees F, ASTM D 746.

2. Flammability Resistance: Self-extinguishing, ASTM D 1692.

C. Metal Flashing and Closures: 22 gage minimum, with ASTM A653, G90 zinc coating, unless noted otherwise on drawings.

D. Shear Connectors: Headed stud type, ASTM A 108 Grade 105 or 1020, cold-finished carbon steel complying with AISC specifications.

2.03 FABRICATION

A. Corrugated sheets or sections shall be designed to support required live load between supporting members.

B. Wherever practical, provide decking in lengths to span over three or more supports.

C. Except as detailed otherwise, provide decking with interlocking side laps, 2-1/2 inches minimum end bearing, and 1-1/2 inches minimum side bearing.

D. Welding: Provide materials and methods in accordance with recommendations of steel decking manufacturer and reviewed submittals. Hold decking tight to the supporting elements with screws or other means for proper welding or crimping of the decking edges. Conform to AWS D1.3, CBC Standards, and to the patterns and weld types indicated, with welds free from sharp edges and protrusions. Field coat welds and abraded surfaces at completion with a anodic type galvanizing repair paint. Omit the field paint coating where welds or abrasions are covered by concrete fill or sprayed fireproofing.

PART 3 - EXECUTION

3.01 OPENINGS

A. Cut and reinforce units to provide openings which are located and dimensioned on the structural and mechanical Drawings.

B. Provide openings, as approved by the Architect and Structural Engineer, for other Work not indicated on the Drawings.

3.02 INSTALLATION

A. Install metal decking in accordance with decking manufacturers' recommendations, requirements of Drawings, Shop Drawings, and Specifications.

B. Install metal decking on supporting steel framework and adjust to final position before permanently fastening in place.

1. Install each unit to proper bearing on supports.
2. Install units in straight alignment for entire length of run of cells with close registration of cells of one unit with those of abutting unit.

C. Fasten decking to steel framework at ends of units and at intermediate supports. Welding shall be as indicated on Drawings.

D. Fasten side laps between supports as indicated on Drawings.

E. Perform field cutting parallel with cells in area between cells, leaving sufficient horizontal material to permit welding to support steel.

F. Weld shear connectors to supports thru decking units as required by Drawings. Weld only on clean, dry surfaces. Do not weld shear connectors thru two layers of decking units.

3.03 METAL FLASHINGS AND CLOSURES

A. Furnish, install, and weld in position, sheet metal closure flashing, closure angles, closure plates, profile plates, and shear plates.

B. Close open ends of cell runs at columns, openings, walls, similar interruptions and termination.

3.04 FIELD QUALITY CONTROL

A. Inspection: Install steel decking under continuous inspection according to CBC Chapter 22A, Chapter 17A, and Section 01 40 00

3.05 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.06 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 06 10 50

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide miscellaneous wood blocking and plywood, including blocking for roofing system and related flashing.

1. Provide plywood panel boards.
2. Preservative treat wood members as indicated.

B. Related Sections:

1. Section Fire Alarm

1.2 REFERENCES

A. Forest Products Society (FPS): National Design Specification for Stress Grade Lumber and its Fastening.

1.3 SUBMITTALS

A. Product Data: Submit wood treatment certifications and instructions for proper use of each type of treated material.

B. Wood Product Certification: Furnish certification indicating wood products are from “well-managed” forests.

1.4 QUALITY ASSURANCE

A. Lumber Grades: Provide visible grade stamp of an agency certified by FPS.

B. Lumber Standard: Comply with US Product Standard PS20 for each indicated use, including moisture content and actual sizes related to indicated nominal sizes.

C. Plywood Standard: Comply with PS1 (ANSI A199.1).

D. Certified Wood Products: Wood products to be from forests certified “well-managed” by an agency accredited by Forest Stewardship Council (FSC) including SmartWood Program and Forest Conservation Program.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Requirements: Provide miscellaneous wood blocking and plywood, including blocking for roofing system and related flashing.

B. Regulatory Requirements: Comply with applicable code requirements for miscellaneous rough carpentry.

C. Blocking: Provide dimensional lumber graded in accordance with FPS Grading Rules; Construction Grade, Douglas Fir; minimum S-Dry.

D. Plywood: Provide minimum APA C-D exterior (CDX) plywood; stress rated where spanning between supporting members; fire retardant treated; minimum 3/4" thick unless otherwise indicated.

E. Plywood Panel Boards: Provide panel boards for electrical and communication panel boards; APA C-D plugged, interior type plywood with exterior glue, fire retardant treated; minimum 1/2" thick.

F. Nails, Spikes and Staples: Galvanized; size and type to suit application.

G. Bolts, Nuts, Washers, Lags, Pins and Screws: Medium carbon steel; galvanized; size and type to suit application.

H. Fasteners: Provide fasteners as required for complete, secure installation of miscellaneous rough carpentry.

1. Solid Masonry or Concrete: Expansion shield and lag bolt type.

2. Steel: Bolts or powder activated type.

2.2 FABRICATION

A. Wood Preservation: Treat lumber and plywood to comply with applicable requirements of American Wood Preservers Association and applicable codes.

1. Decay Resistance Treatment: Pressure treat wood in accordance with AWPA U1 using preservative chemicals acceptable to authorities having jurisdiction and containing no arsenic or chromium.

a. Treat wood members based on AWPA U1 Use Categories as appropriate to Project location and exposure.

b. Kiln-dry wood to a maximum moisture content of 19% after treatment with water-borne preservative.

2. Fire Retardant Treatment: Comply with AWPA standards for pressure impregnation with fire-retardant chemicals to achieve flame-spread rating of not more than 25 in accordance with ASTM E84 or UL Test 723.

a. Treat interior wood and plywood complying with applicable code requirements for Interior FRTW.

1) Exterior Type: Where indicated for exterior applications, provide fire treated wood passing ASTM D2898 rain test.

b. Provide UL label on each piece of fire-retardant wood and plywood.

c. Kiln-dry treated items to maximum moisture content of 19%.

3. Complete fabrication of treated items prior to treatment, wherever possible; if cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment.

4. Inspect each piece after drying and discard damaged and defective pieces.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place miscellaneous rough carpentry true to lines and levels.

B. Correlate location so attached work will comply with design requirements and be properly located.

C. Construct members of continuous pieces of longest possible lengths.

D. Fit carpentry work to other work; scribe and cope as required for accurate fit.

E. Shim with metal or slate for bearing on concrete and masonry.

F. Securely attach carpentry work to substrates by anchoring and fastening as required by recognized standards.

1. Provide washers under bolt heads and nuts in contact with wood.

G. Wood Blocking: Provide blocking of S4S lumber not less than 1-1/2" wide and of thickness required to provide adequate support or to properly locate attached material.

1. Provide attachment to other work; form to shapes shown.

2. Countersink bolts and nuts flush with surfaces.

3. Remove temporary blocking when no longer needed.

4. Anchor to formwork before concrete placement.

5. Build into masonry as work progresses, cutting to fit masonry unit size involved.

H. Plywood: Comply with recommendations of American Plywood Association (APA) for fabrication and installation of plywood work.

END OF SECTION

SECTION 07 01 80

APPLIED FIREPROOFING PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Patch existing sprayed-on type fireproofing and match existing fire-ratings.

B. Related Sections:

1. Section 07 84 00: Firestopping.

1.2 REFERENCES

A. Underwriters Laboratories (UL): Fire Resistant Directory.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Certificate: Submit manufacturer certification indicating applicator acceptability and material compliance with applicable codes and Contract Documents.

1. Certification shall indicate new materials used to patch existing fireproofed members at new and existing work are compatible with existing fireproofing materials and meet all performance requirements.

C. Test Reports: Submit reports indicating compliance with design and performance requirements.

1. Furnish test reports of independent testing agencies acceptable to applicable authorities indicating conformance to ASTM E119 and ASTM E84.

2. Enforcement Agency Approvals: Provide information required by enforcing agencies to establish acceptance of materials in general and for specific applications.

1.4 QUALITY ASSURANCE

A. Qualification of Applicator: Firm acceptable to manufacturer of fireproofing materials, with minimum five years successful experience on projects of similar scope.

1.5 SITE CONDITIONS

A. Ensure structure to which fireproofing is applied is not enclosed and surfaces are open to view until application is reviewed.

B. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F.

C. Provide ventilation in areas to receive fireproofing during and 24 hours after application, to properly dry material and maintain nontoxic, unpolluted working area.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Grace Construction Products/Monokote MK-6 or Retro-Guard.

B. Albi Manufacturing/Duraspray.

C. Southwest Fireproofing Products Co./Type 5 or 7.

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Requirements: Provide sprayed-on type fireproofing as required to existing fireproofing system and maintain fire-ratings as required for Project.

B. Regulatory Requirements: Comply with applicable codes for fireproofing.

1. Fire Resistance Ratings: Comply with required ratings based on tests in accordance with ASTM E119.

2. Surface Burning Characteristics: Maximum 25 flame spread and 450 smoke developed when tested in accordance with ASTM E84.

C. Design Criteria: Provide materials capable of attaining fire ratings as required for Type IA, Fire Resistive construction.

D. Performance Criteria: Provide materials listed by UL or independent testing and inspection agency acceptable to applicable authorities.

1. Bond strength of fireproofing, ASTM E736, tested to provide minimum average bond strength of 200-psf and individual bond strength of 150 psf.

2. Compressive Strength: Maximum deformation of 10% when subjected to compressive forces of 1000-psf, ASTM E761.

3. Air Erosion: Maximum allowable weight loss of fireproofing material shall be 0.005 gm/sf when tested in accordance with ASTM E859.

4. Mold Resistance: Materials to show resistance to mold growth, ASTM C665 or ASTM G21.

5. Combustibility: Maximum total heat release of 20 MJ/m^2 ten minutes after exposure to radiant heat flux of 75 KW/m^2, ASTM E1354.

E. Sprayed-On Fireproofing: Mill mixed cementitious formulation for sprayed-on application; other types of material subject to prior Architect and Owner approval.

1. Materials: Compatible with existing materials and systems; blended for even texture; with no asbestos.

F. Water: Clean, free of materials harmful to fireproofing.

G. Hard Coat: Provide manufacturer's standard hard-coat topping or special hard system for applications subject to abuse.

H. Sealer: Manufacturer's standard material recommended for use on applications of sprayed-on fireproofing exposed to exterior and high humidity.

PART 3 - EXECUTION

3.1 PREPARATION

A. Comply with manufacturer's recommendations and installation instructions for preparation of surfaces to receive sprayed-on fireproofing.

B. Protect adjacent surfaces and equipment from damage by overspray, fallout, and dusting; mask adjacent work as required.

C. Provide temporary enclosure to prevent spray from contaminating air.

D. Close off and seal duct work in areas where fireproofing is being applied.

E. Clean substrate of dirt, dust, grease, oil, loose material, paints, primers, and other matter which affects bond of sprayed fireproofing.

F. Remove incompatible materials which affect bond by scraping, brushing, scrubbing or sand blasting.

G. Verify bond requirements and compatibility of surfaces to receive fireproofing before application of sprayed-on fireproofing.

H. Ensure ducts, piping, equipment and items that would interfere with application of fireproofing are not positioned until fireproofing work is completed.

I. Ensure clips, hangers, support sleeves and other attachments required to penetrate fireproofing are in place prior to application of fireproofing.

3.2 APPLICATION

A. Mix and apply fireproofing in strict accordance with manufacturer's recommendations and installation instructions.

B. Apply fireproofing in sufficient thickness and density to achieve required fire ratings.

C. Apply fireproofing over substrate, building to required thickness with as many passes or stages necessary to cover with monolithic blanket of uniform density and texture.

D. Provide protective hard coat at surfaces subject to damage by abrasion and damage by vandalism.

E. Provide sealer at fireproofing exposed to exterior and to high humidity.

3.3 SITE QUALITY CONTROL

D. Site Tests and Inspections: Testing and inspection will be required to ensure applied thickness and density meets fire rating requirements and reviewed test reports.

1. Correct unacceptable work and pay for further testing required to prove acceptability of installation.

2. Patch test areas as required to re-establish fireproofing integrity.

3.4 CLEANING

A. Remove excess and overspray, droppings and debris.

B. Remove fireproofing from materials and surfaces not required to be fireproofed.

3.5 PROTECTION

A. Protect applied fireproofing from damage by subsequent operations; repair damaged fireproofing before fireproofing is enclosed.

END OF SECTION

SECTION 07 26 00

BELOW-GRADE METHANE MEMBRANE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide vapor membrane system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor retarder and aggregate bed below vapor retarder.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

1.3 SITE CONDITIONS

A. Do not apply vapor retarder during inclement weather or when air temperature is below 40 degrees F.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. As indicated in methane mitigation documents.

B. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description Includes: Provide membrane system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor retarder and sand bed below vapor retarder.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure sleeves, curbs and projections that penetrate vapor retarder are properly and rigidly installed.

B. Ensure substrate is free of projections and irregularities that may be detrimental to proper installation of vapor retarder.

3.2 INSTALLATION

A. Spread and roll sand to provide smooth, even bed for vapor retarder.

B. Apply vapor retarder in accordance with manufacturer's recommendations.

C. Inspect and repair vapor retarder prior to application of concrete slab; tape tears and repair damage.

END OF SECTION

SECTION 07 41 15

MANUFACTURED BATTEN SEAM ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide factory finished manufactured metal batten seam type roofing including integral metal flashings and sealants, and accessories as required for complete weather-tight installation.

B. Related Work:
   1. Section 07 60 00: Flashing and sheet metal not integral with roofing.

1.2 REFERENCES

A. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Convene pre-construction conference one week prior to metal roofing work to coordinate roofing with other trades; require attendance of parties directly affecting metal roofing work.

   1. Review installation and coordination required with related work.

1.4 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for prefabricated components, and recommendations for cleaning and protection.

B. Shop Drawings: Indicate dimensioning, panel layout, general construction details including closures, flashings, locations of and types of sealants, and anchorage.

C. Samples: Furnish finished preformed metal roofing and each type of exposed metal flashing.

1.5 QUALITY ASSURANCE

A. Qualification of Installer: Company with minimum five years successful experience in work of comparable scope.

B. Mock-Up: Provide 200 square foot mock-up of metal roofing construction at location approved by Architect; approved mock-up may be incorporated into Project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Provide protective covering on finished flashing materials to protect them through installation.

1.7 WARRANTY

A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from wind and water penetration. Repair system and pay for or replace damaged materials and surfaces.

1. Period: Three years.

B. Manufacturer’s Warranty: Submit manufacturer’s warranty including special manufacturer services as required for manufacturer’s warranty.

1. Period: 20 years.

2. Manufacturer's warranty shall not detract from requirements of extended correction period nor from Owner’s rights under implied and expressed warranties regardless of wording of manufacturer’s warranty.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Morin: Basis of Design

B. AEP Span.

C. Berridge Manufacturing Co.

D. ATAS International, Inc.

E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description Includes: Provide factory finished manufactured metal batten seam type roofing including integral metal flashings and sealants, and accessories.

B. Regulatory Requirements: Comply with California Building Standards Code requirements for metal roofing systems.

1. Cool Roof System: Comply with California Building Standards Code requirements for “Cool Roof” system including three-year aged solar reflectance value requirements.

a. Label: System to have Cool Roof Rating Council (CRRC) label.

C. Design Criteria: Design system to provide movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to 100-year seasonal temperature ranges.

1. Design system to accommodate tolerances of structure, provided irregularities do not exceed industry recognized standards and clearances are maintained.

2. Provide for positive drainage of water entering or occurring within preformed metal roofing system.

D. Batten Seam Metal Roofing System: Preformed metal roofing system complete with anchoring assembly and accessory components.

1. Type: Manufacturer's standard batten seam system specified with pans approximately 16" on center unless otherwise indicated.

2. Sheet Metal: Minimum 24 gage galvanized steel, minimum G90 galvanized coating, ASTM A924 and A653.

3. Finish: Manufacturer's standard fluoropolymer coil coat finish complying with AAMA 605.2.

4. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

E. Sealants and Gaskets: Manufacturer's standard type suitable for use in conjunction with installation of metal roofing.

1. Non-staining; non-corrosive; non-shrinking and non-sagging; ultra-violet and ozone resistant for exterior applications.

2. Color of exposed sealants and gaskets to match roofing.

F. Fasteners: Manufacturer's standard hot dip galvanized fasteners with not less than G90 galvanized coating.

1. Finish exposed fasteners to match roofing.

G. Underlayment: Specified in Section 07 28 00 – Weather Barrier/Underlayment.

2.3 FABRICATION

A. Internal and External Corners: Same materials, material thickness and finish as roofing, profile to suit system, brake formed, shop cut and factory mitered to required angles.

B. Mitered internal corners shall be backed with minimum 22 gage galvanized steel sheet stock to maintain continuity of profile.

C. Expansion Joints: Provide concealed metal expansion control throughout roofing system.

D. Sheet Metal, Flashings, Gutters, Closures and Other Components: Brake formed to required profiles; conform to SMACNA Manual.

1. Conform to requirements specified in Section 07 60 00 - Flashing and Sheet Metal

E. Provide for positive drainage to exterior, any water entering or occurring within metal roofing systems.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate is free of elements that could be harmful to system.

B. Beginning of work signifies acceptance of conditions.

C. Take special care not to damage underlayment beyond that required to secure system to structure.

3.2 INSTALLATION

A. Install manufactured metal batten seam roofing in accordance with manufacturer's recommendations, installation instructions, and approved shop drawings.

B. Install metal flashing and sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.

1. Comply with installation requirements specified in Section 07 60 00 - Flashing and Sheet Metal.

C. Exercise care when cutting materials on site, to ensure cuttings do not remain on finished surfaces.

D. Protect metal surfaces in contact with cementitious materials and dissimilar metals with bituminous paint; allow protective coating to dry prior to installing members.

E. Permanently fasten roofing system to structural supports, properly aligned, leveled and plumb.

1. Maximum 1/16" offset from true alignment between adjacent members butting or in line.

2. Maximum 1/4" variation from plane or location indicated on Drawings.

F. Locate end laps over supports; end lap panels minimum 2"; ensure side-laps are over firm bearing.

G. Provide expansion joints at regular basis, concealed within system.

H. Use concealed fasteners except where specifically approved by Architect.

I. Install sealants and gaskets where required to prevent direct weather penetration.

J. Completed installation shall be free of rattles, noise due to thermal and air movement, and wind whistles.

K. Remove protective coating when no longer required to protect roofing and flashing from construction.

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concealed fastener single-skin metal wall panels.

B. Accessories including fasteners, perimeter trim and penetration treatments.

1.2 REFERENCES

A. ASTM International

1. ASTM A240; Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. ASTM A653; Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
3. ASTM A666; Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
4. ASTM A792; Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
5. ASTM B209; Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
6. ASTM C612; Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
7. ASTM C645; Standard Test Method for Nonstructural Steel Framing Members.
8. ASTM D2244; Standard practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
9. ASTM D4214; Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
10. ASTM E283; Standard Test Method for determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors under Specified Pressure Differences across the Specimen.
11. ASTM E331; Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
12. ASTM E1592; Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

1.3 SUBMITTALS

A. Refer to Section 01 60 00 Product Requirements

B. Product Data: Submit manufacturer current technical literature for each type of product.

C. Delegated Design: Design metal wall panel assembly, submit comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

D. Shop Drawings - Submit detailed drawings showing:

1. Profile
2. Gauge of panel
3. Location, layout and dimensions of panels
4. Location and type of fasteners
5. Shape and method of attachment of all trim
6. Locations and type of sealants
7. Installation sequence.
8. Other details as may be required for a weathertight installation

E. Samples: Provide nominal 3 x 5 inch of each color indicated.

a. content.

F. Quality Assurance Submittals

1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with requirements.
2. Manufacturer Erection Instructions: Provide manufacturer's written installation instructions including proper material storage, material handling, installation sequence, panel location(s), and attachment methods, details and required trim and accessories.

G. Closeout Submittals

1. Refer to Section 01 77 00 Closeout Procedures

1.4 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation meeting: Conduct a pre-installation meeting at the job site attended by Owner, Architect, Manufacturer's Technical Representative, Panel Installer, and Contractors of related trades. Coordinate structural support requirements in relation to wall panel system, installation of any separate air/water barriers, treatment of fenestration, and other requirements specific to the project.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall have a minimum of ten (10) years experience in the production of metal wall panels. Manufacturer shall demonstrate past experience with examples of projects of similar type and exposure.

B. Installer Qualifications: Installer shall be authorized by the manufacturer and the work shall be supervised by a person having successfully completed a manufacturer training seminar regarding proper installation of the specified product.

1.6 DELIVERY, STORAGE AND HANDLING

A. Refer to Section 01 60 00 Product Requirements

B. Deliver panel materials and components in manufacturer's original, unopened, undamaged packaging with identification labels intact.

C. Store wall panel materials on dry, level, firm, and clean surface. Elevate one end of bundle to allow moisture run-off, cover and ventilate to allow air to circulate and moisture to escape.

1.7 WARRANTY

A. Refer to Section 01 78 00 Warranties

B. Material Warranty: Standard form in which manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period. The items covered by the warranty include structural performance and finish performance.

1. Warranty Period: Two (2) years from date of Substantial Completion.

C. Finish Warranty: Standard form in which manufacturer agrees to repair or replace metal panels that evidence deterioration of fluoropolymer finish, including flaking or peeling from approved primed metal substrate, chalk in excess of 8 when tested in accordance with ASTM D4214, Method A, and /or color fading in excess of 5 ΔE Hunter units on panels when tested in accordance with ASTM D2244.

1. Warranty Period: Twenty (20) years from date Substantial Completion, or 20 years and 3 months from the date of shipment from manufacturer's plant, whichever occurs first.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Morin; a Kingspan Group Company; 685 Middle Street, Bristol, Connecticut 06010-8416; 1-800-640-9501 (www.morincorp.com).

B. Basis of Design: “Morin Matrix Series Wall Panels”.

C. Substitution Limitations:

1. Submit written request for approval of substitutions to the Architect a minimum of [14] days prior to the date for receipt of bids Include the following information:

   a. Name of the materials and description of the proposed substitute.
   b. Drawings, cut sheets, performance and test data.
   c. List of projects similar scope and photographs of existing installations.
   d. Other information necessary for evaluation.

2. After evaluation by Architect, approval will be issued via addendum. No verbal approval will be given.

3. Substitutions following award of contract are not allowed except as stipulated in Division 01 – General Requirements.

2.2 PERFORMANCE CRITERIA

A. Structural Performance: Provide metal wall panel systems designed to resist the following loads. Testing shall be done based on ASTM E1592:

1. Wind Loads: Determine loads based on the following minimum design wind pressures:

   a. Uniform pressure [Insert design wind pressure] [as indicated on Drawings].

2. Deflection Limits: Metal wall panel assemblies shall withstand horizontal deflections no greater than [L/180] [L/240] [Insert deflection] of the span.

B. Water Penetration under Static Pressure: Provide metal wall panel systems designed to resist penetration of water under static pressure. Testing shall be based on ASTM E331. Wall panels when tested shall have no water leakage at 6 pounds per square foot.

C. Air Infiltration: Provide metal wall panel assemblies designed to resist air infiltration. Testing shall be done based on ASTM E283. Wall panels when tested shall have a maximum air leakage of 0.01 cfm per square feet of fixed wall area at a minimum static air-pressure differential of 1.57 foot pounds per square foot.

2.3 WALL PANEL MATERIALS

A. Steel:

1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792, Class AZ50 coating designation, Grade 40.
2. Gauge: 20

2.4 CONCEALED FASTENER WALL PANELS

A. Wall Panel Description:

1. Panel Width: 12 inches.
2. Profile: MX 3.0
3. Panel thickness: 1-1/2 inch thick.
4. Panel joint: Tongue and groove interlock joint.
5. Texture: Smooth

B. Liner Panel Description:

1. Panel Width: 12 inches; liner panel series

2.5 ACCESSORIES

A. Wall panel accessories: Provide accessories as required for a complete installation. Accessories shall be as indicated on approved shop drawings and per manufacturer's approved standard details. Match material and finish of metal wall panels.

1. Closure Strips:

   a. Closed Cell Closure Strips: Provide minimum 1 inch thick matching metal wall panel profile.
   b. Metal Profile Closure Strips: Shall be fabricated from same gauge, material and finish as metal panel.

2. Concealed Clips: 18 gauge; Zinc-Coated (Galvanized) Steel Sheet: ASTM A653, G90 coating designation

3. Panel Reveal Trim: Extruded aluminum; 0.078 inch thick, 6063-T5 alloy.

   a. Profile: MT 3.0 where shown on Drawings.

B. Trim:

1. Fabricate trim from same material and material thickness as wall panels. Finish to match metal wall panels.
2. Locations include, but are not limited to the following: Drips, sills, jambs, corners, framed openings, reveals and fillers.

C. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

2.6 FABRICATION

A. Metal wall panels shall be formed to lap and interconnect with edges of adjacent panels which are then mechanically attached through panel to supports using concealed fasteners.

B. Panels shall be factory formed. Field formed panels are not acceptable.

C. Trim Accessories: Fabricate steel trim accessories to comply with recommendations outlined in SMACNA's "Architectural Sheet Metal Manual".

D. Mitered Corners: Structurally bonded horizontal outside or inside trimless corners matching metal wall panel material, profile and factory applied finish shall be fabricated by metal wall panel manufacturer.

1. Welded, riveted or field fabricated coners do not meet the requirements of this specification.
2. Basis of Design: Morin Miterseam Corners (24” x 24”)

2.7 FINISHES

A. [Steel]

1. Finish and Color:

a. Color: Regal Blue or Tahoe Blue, samples to be reviewed in the field for approval.

b. Finish System:

1) 1.0 mil. Fluropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70 percent) SOLID color coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Provide field measurements to manufacturer as required to achieve proper fit of the metal wall panels to building envelope. Measurements shall be provided in a timely manner so that there is no impact to construction or manufacturing schedule.

B. Supporting Steel: All structural supports required for installation of panels shall be by others. Support members shall be installed within the following tolerances:

1. Plus or minus 1/8 inch in 5 feet in any direction along plane of framing.
2. Plus or minus ¼ inch cumulative in 20 feet in any direction along plane of framing.
3. Plus or minus ½ inch from framing plane on any elevation.
4. Plumb or level within 1/8 inch at all changes of transverse for performed corner panel applications.
5. Verify that bearing support has been provided behind vertical joints of horizontal panel systems and vertical joints of horizontal panel systems. Width of support shall be as recommended by manufacturer.

C. Examine individual panels upon removing from the bundle; notify manufacturer of panel defects. Do not install defective panels.

3.2 PANEL INSTALLATION

A. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.

B. Install panels plumb, level, and true-to-line to dimensions and layout indicated on approved shop drawings.

C. Cutting and fitting of panels shall be neat, square and true. Torch cutting is prohibited.

3.3 TRIM INSTALLATION

A. Place trim and trim fasteners only as indicated per details on the approved shop drawings.

B. Apply sealant tape at trim, per manufacturer's details and approved shop drawings, for weathertight installation.

3.4 SEALANT INSTALLATION FOR EXPOSED JOINTS

A. Clean and prime surfaces to review exterior exposed sealants in accordance with sealant manufacturer's recommendations.

B. Follow sealant manufacturer's recommendations for joint width-to-depth ratio, application temperature range, size and type of backer rod, and compatibility of materials for adhesion.

3.5 CLEANING AND PROTECTION

A. Remove protective film immediately after installation.

B. Touch-up, repair or replace metal panels and trim that have been damaged.

C. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

END OF SECTION

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide metal flashings and sheet metal including accessories as required for complete weathertight installation.

1. Flashing and sheet metal includes copings, fascias, scuppers, gutters, downspouts, rainwater leaders, reglets, and similar fabricated components as applicable to Project.

2. Provide concealed sealants used in conjunction with installation of metal flashing and sheet metal.

3. Provide miscellaneous sheet metal flashing and reglets not provided by other trades or suppliers.

a. Where reglets are to be installed in conjunction with other work, provide in adequate time for installation.

b. Where reglets are to be surface applied, provide continuous gasket between reglet and surface.

4. Provide precast concrete splash blocks.

B. Related Sections:
1. Section 07 41 10: Flashing and sheet metal integral with metal roofing.

1.2 REFERENCES

A. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Product Data: Furnish literature for manufactured products.

B. Shop Drawings: Clearly indicate dimensioning, layout, general construction details including closures, flashings, locations and types of sealants, anchorages, and method of anchorage.

C. Samples: Furnish samples of typical metal flashing fabrication indicating standard soldered joints and edge conditions.

1.4 QUALITY ASSURANCE

A. Sustainability Requirements:

1) two years' successful experience with CAL/Green requirements.

2. *CAL*Green Requirements: Refer to Section 01 35 15 – *CAL*Green Environmental Requirements and comply with applicable *CAL*Green Checklist indicating requirements applicable to Project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Provide strippable film protective covering on shop finished flashing materials to protect materials through shipping, fabrication and installation.

1.6 WARRANTY

A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from wind and water penetration. Repair system and pay for or replace damaged materials and surfaces.

1. Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide flashing and sheet metal including reglets and accessories as required for complete weathertight installation.

B. Design Criteria: Allow for movement of components without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to 100-year seasonal temperature ranges.

1. Shop Finished Galvanized Steel Flashing and Sheet Metal: ASTM A924 and A653 G90 galvanized steel; minimum 24-gage; with factory applied fluoropolymer coating based on Kynar 500 or Hylar 5000.

a. Manufacturers:

1) Ryerson Building Products (800.328.7800)/ColorKlad.
2) Metal Sales Manuf. Corp.(800.406.7387)/PVDF (Kynar 500).
3) K&M Sheet Metal (888.567.7778)/Kynar Steel.
4) Substitutions: Refer to Section 01 25 00.

b. Location (Exposed): Where indicated, if not otherwise indicated, provide where flashing will be exposed to view from exterior of building, and where exposed to view from spaces within building.

c. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

d. Touch-up Paint for Prefinished Sheet Metal: Type recommended by fluoropolymer manufacturer for field touch-up.

2. Prefinished High-Performance Coated Aluminum: Manufacturer's standard two coat thermocured fluoropolymer system containing not less than 70-percent polyvinylidene fluoride resin by weight; AAMA 2605 and AA-C12C42R1x.

a. Manufacturers:

1) Ryerson Building Products (800.328.7800)/AlumaKlad.
2) Merchant & Evans Industries, Inc.(800.257.6215)/Custom.
3) Substitutions: Refer to Section 01 25 00.

b. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

c. Touch-up Paint for Prefinished Sheet Metal: Type recommended by fluoropolymer manufacturer for field touch-up.

3. Accessories: Provide strainers, outlet tubes, screens, baffles, hangers and gutter ends as required for a complete system and complying with SMACNA Manual.

4. Provide heavier gage metal where recommended by SMACNA Manual for size of component.

C. Manufactured Reglets: Snap-on type, for two-piece flashing; metal to match flashing and sheet metal.

1. Manufacturers:

a. Fry Reglet Corp./Springlok System.
b. W.P. Hickman Co./The Leading-Edge Drive Lock System.
c. Substitutions: Refer to Section 01 25 00.

D. Solder and Fasteners: As recommended by SMACNA and complying with applicable codes and regulations; hot dipped galvanized minimum coating comparable to G90.

E. Concealed Sealant: Butyl type for use in conjunction with sheet metal; non-staining; non-corrosive; non-shrinking and non-sagging; ultra-violet and ozone resistant for exterior concealed applications.

F. Bituminous Paint: Acid and alkali resistant type; black color; asbestos free.

G. Plastic Cement: Cutback asphaltic type; asbestos free.

H. Sealing Compound: Type recommended by roofing manufacturer; asbestos free.

I. Gaskets: Type suitable for use in conjunction with sheet metal; non-staining, non-corrosive, non-shrinking, non-sagging, ultra-violet resistant, and ozone resistant; for exterior concealed applications.

1. Manufacturers:

a. Emseal USA, Inc./Emseal MST Multi-Use Sealant Tape.
b. Substitutions: Refer to Section 01 25 00.

2.2 FABRICATION

A. Fabricate sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.

B. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

1. Fabricate corners and intersections in shop with solder joints; watertight fabrication.

C. Form sections in maximum 10'-0" lengths; make allowance for expansion at joints.

D. Hem exposed edges on underside 1/2".

E. Back-paint flashings with heavy bodied bituminous paint where in contact with cementitious materials or dissimilar metals.

F. Form pitch pans watertight, with minimum 4" upstand and 4" flanges; form pans minimum 6" wider than item passing through roof membrane.

G. Form umbrella flashings with minimum 2" overhang, to shed water away from pitch pans.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install metal flashing and sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.

1. Install tight in place, with corners square, surfaces true and straight in planes, and lines accurate to profiles as indicated on Drawings.

2. Lap joints in direction of water flow.

3. Hold downspouts in position, clear of wall, by hangers spaced not more than 10'-0" on center; securely fasten hangers to wall without exposed damage to wall surface.

B. Exercise care when cutting materials on site, to ensure cuttings do not remain on finished surfaces.

C. Provide expansion joints concealed within system.

D. Use concealed fasteners, continuous cleat type, except where specifically approved by Architect.

1. Exposed fasteners may be used, where clearly indicated on shop drawings and approved by Architect, at areas not exposed at exterior walls nor in sight of interior spaces.

E. Apply sealing compound at junction of metal flashing and felt flashing.

F. Lock seams and end joints; fit flashing tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

G. Counter-flash mechanical and electrical items projecting through roof membrane.

H. Install sealants where required to prevent direct weather penetration.

1. Install continuous gasket behind surface applied reglets.

I. Completed installation shall be free of rattles, noise due to thermal and air movement, and wind whistles.

J. Install pitch pans and fill with plastic cement.

K. Install umbrella flashing with draw band collars with sheet metal sealant between penetrating item and flashing; use wood blocking at angle type penetrations and cover blocking with sealant.

3.2 CLEANING

A. Remove protective coating from shop finished sheet metal when no longer required to protect roofing and flashing from construction.

B. Touch-up scratched and damaged finish to match new; remove and replace sheet metal units that cannot be repaired to look identical to adjacent sheet metal when viewed from 15'-0" away.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide firestopping as required to maintain effective barrier against spread of flame, smoke and gases, and to retain integrity of time-rated construction as indicated and at following types of locations.

1. Provide at fire rated system perimeters, and at duct, conduit, piping penetrations through time-rated construction, and as required by applicable codes.

2. Coordinate requirements for firestopping with work involving penetrations through fire rated assemblies.

3. Review Project and Contract Documents to ascertain extent of penetrations in fire rated assemblies and methods included in other sections for maintaining fire ratings.

B. Related Sections:

1. Section 07 90 00: Non-fire rated joint sealants.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate firestopping with fire rated assemblies and penetrations through fire rated assemblies to ensure compliance with applicable codes and regulations to maintain integrity of fire rated assemblies.

1. Firestopping may be integral with some systems and may be specified as part of other systems including mechanical and electrical systems.

B. Coordination with Acoustical Assemblies: Where a firestopping sealant is required at a penetration of an acoustical assembly, provide a fire-rated acoustical sealant such as Pecora/AC-20 FTR, or Hilti/CP 606.

1. Do not use intumescent firestopping at acoustically rated assemblies.

2. Coordinate with Section 09 21 00 – Gypsum Board Assemblies.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's literature including data for materials and prefabricated devices, including descriptions to identify materials and devices on job.

1. Submit Underwriter's Laboratory approval numbers for required fire ratings; approval of other laboratories contingent upon acceptance of applicable authorities.

2. Deferred Approvals: Submit data necessary for applicable authorities for each type of firestopping required including firestopping at fire rated assembly junctures, and penetrations through fire rated assemblies.

B. Shop Drawings: Submit manufacturer's installation details.

C. Certificates of Compliance: Submit manufactures' certificates, accompanied by classifications, indicating material or combination of materials used meets requirements specified for flame spread and fire resistance.

1. Certificates to be supported by test reports by nationally recognized testing authority or otherwise satisfactory to authorities.

D. Manufacturer's Instructions: Maintain copy of manufacturer's installation instructions and recommendations at each work area.

1.4 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements relative to finish material pollution control for sealants.

1.5 DELIVERY, STORAGE, AND HANDING

A. Deliver materials in their original unopened packages and store in location providing protection from damage and exposure to elements.

B. Damaged or deteriorated materials shall be removed from site.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. AD Fire Protection Systems/AD Firebarrier Firestopping Materials.

B. Hilti, Corp./Hilti Firestop Systems.

C. 3M Fire Protection Products Div./3M Fire Barrier Products.

D. Specified Technologies, Inc. (STI)/SpecSeal and Pensil Firestopping.

E. Tremco/Firestopping Products.

F. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide firestopping as required to maintain effective barrier against spread of flame, smoke and gases, and to retain integrity of time-rated construction.

1. Choose products and methods meeting applicable codes and Specification requirements for each firestopping application, subject to Architect's acceptance.

B. Regulatory Requirements: Comply with California Building Code, Chapter 7 requirements for firestopping, including both F Ratings and T Ratings as applicable.

C. Design Requirements: Provide materials tested in accordance with following standards, unless otherwise specified.

1. American Society for Testing and Materials (ASTM) Publications:

a. ASTM E84, Surface Burning Characteristics of Building Materials.
b. ASTM E119, Fire Tests of Building Construction and Materials.
c. ASTM E814, Fire Tests of Through-Penetration Fire Stops.
d. ASTM E1966, Test Method for Fire-Resistive Joint Systems.

D. Firestopping Materials: Furnish materials for penetrations in time-rated floor, wall, and partition assemblies capable of preventing passage of flame, smoke, and hot gases.

1. Penetration Test: Furnish materials passing ASTM E814 or E1966 for penetration fire stopping indicating maintenance of time-rated adjacent assemblies.

a. Additional Tests: Where required by applicable authorities, provide materials passing ASTM E119 time-temperature fire conditions for fire ratings indicated for assemblies.

2. Flame Spread: ASTM E84 flame spread rating of 25 or less.

3. Smoke Developed: ASTM E84 smoke developed rating of 450 or less.

E. Firestopping: Maintain fire rating of assembly in which firestopping is installed, such as floor, partition, or wall, in accordance with ASTM E119 tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and conditions receiving or affecting the work. Do not proceed until unsuitable conditions are corrected.

3.2 INSTALLATION

A. Install firestopping in accordance with manufacturer's recommendations and installation instructions.

B. Completely fill void space with firestopping materials regardless of geometric configuration, subject to tolerances established by firestopping manufacturer.

C. Apply firestopping materials at penetrations of pipes, conduits, and ducts prior to application of insulation.

1. Remove insulation already in place at penetration prior to application of firestopping materials unless insulation meets requirements for fire ratings indicated.

3.3 FIELD QUALITY CONTROL

A. Inspection: Keep area of work available for inspection by Architect and applicable authorities before and after application of firestopping.

3.4 REPAIR AND CLEAN-UP

A. Repair damage caused by work of this section; clean exposed surfaces soiled by work and leave work ready to receive following work.

B. On completion of work, remove debris, excess materials, and equipment from site.

END OF SECTION

SECTION 07 90 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide joint sealants, for interior and exterior joints not specified elsewhere, with backing rods and accessories as required for complete installation.

1. Joint sealants include joint sealers and calking as indicated.

2. Interior concrete floor control joints.

3. Exterior concrete flatwork expansion joints.

B. Related Sections:

1. Section 07 60 00: Flashing and sheet metal concealed sealants.
2. Section 07 84 00: Firestopping type joint sealants.
3. Section 08 80 00: Glazing sealants.
4. Section 09 21 00: Sealants used for acoustical treatment at gypsum board.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer's descriptive literature.

B. Samples: Furnish samples of each type of exposed joint sealer in required colors.

C. Certifications:

1. Furnish manufacturer's certification joint sealers comply with Contract Documents and are suitable for Project applications.

2. Furnish certification indicating installers are trained in proper use of specified products, qualified, and familiar with proper installation techniques.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with *CAL*Green requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.

1. Provide joint sealants as required by applicable codes and regulations to fill joints and openings in building envelope separating conditioned space from unconditioned space.

B. Installer Qualifications: Firm with minimum five years successful experience on projects of similar type and size, using specified products.

C. Installers shall be familiar with proper application procedures to ensure maximum joint sealer expansion and contraction capabilities.

D. Mock-Up: Provide exterior joint sealers where required for mock-ups of other systems.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, cure time, and mixing instructions.

1.5 SITE CONDITIONS

A. Do not proceed with installation of joint sealers under unfavorable weather conditions.

B. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer.

1.6 WARRANTY

A. Extended Correction Period: Extend correction period to two years.

1. Repair or replace joint sealers which fail to perform as intended, because of leaking, crumbling, hardening, shrinkage, bleeding, sagging, staining, loss of adhesion, and loss of cohesion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide joint sealants with backing rods and accessories.

B. Performance Requirements:

1. Select materials for compatibility with joint surfaces and indicated exposures.

2. Where not indicated, select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.

3. Comply with applicable limitations on volatile organic compound (VOC) emissions.

C. Regulatory Requirements: Comply with applicable regulatory requirements regarding limitations on volatile organic compound (VOC) emissions limitations.

D. Elastomeric Sealants:

1. Single Component Low Modulus Silicone Sealant: ASTM C920 Type S, Class 25, Grade NS; minimum 50% expansion and compaction capability.

    a. Provide at exterior locations not exposed to traffic.

    b. Manufacturers:

        1) GE (Momentive Performance Materials)/Silpruf, Silglaz or GESIL.
        2) Dow Corning Corp./790 or 795.
        3) Pecora Corp./864 Architectural Silicone.
        4) Tremco/Spectrem 3.
        5) Substitutions: Refer to Section 01 25 00.

2. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Grade NS, Class 25, non-sag; minimum 25% expansion and compaction capability.

    a. Provide at exterior locations not exposed to traffic.

    b. Manufacturers:

        1) Pecora Corp./Dynatrol II.
        2) Tremco/Dymeric 240.
        3) BASF/MasterSEal NP 2.
        4) Substitutions: Refer to Section 01 25 00.

3. Single Component Low Modulus Sealant: ASTM C920 Type S, Class 35, Grade NS; minimum 50% expansion and compaction capability.

    a. Provide at exterior locations not exposed to traffic.

    b. Manufacturers:

        1) Fortifiber Building Systems Group/Moistop Sealant.
        2) Sika Group/SikaFlex 1A+.
        3) Substitutions: Refer to Section 01 25 00.

4. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Grade P, Class 25, self-leveling; minimum 25% expansion and compaction capability.

    a. Provide at traffic bearing locations.

    b. Manufacturers:

        1) Pecora Corp./Urexpan NR-200, or Dynatrol II-SG.
        2) Tremco/THC 900-901, or Vulkem 445 SSL.
        3) BASF/MasterSeal SL 2
        4) Substitutions: Refer to Section 01 25 00.

5. Mildew-Resistant Silicone Rubber Sealant: ASTM C920, Type S, Grade NS, Class 25, compounded with fungicide, specifically for mildew resistance and recommended for interior joints in wet areas.

a. Provide at interior joints in wet areas.

b. Manufacturers:

1) GE (Momentive Performance Materials)/SCS 1702 Sanitary Sealant.
2) Dow Corning Corp./786 Bathtub Caulk.
3) Pecora Corp./898 Sanitary Mildew Resistant Sealant.
4) Tremco/Tremsil 200.
5) Substitutions: Refer to Section 01 25 00.

E. Non-Elastomeric Sealants:

1. Acrylic-Emulsion Sealant: ASTM C834 acrylic or latex-rubber-modified acrylic sealant, permanently flexible, non-staining and non-bleeding; recommended for general interior exposure; compatible with paints specified in Section 09 90 00.

a. Provide at general interior applications.

b. Manufacturers:

1) Pecora Corp./AC-20.
2) Tremco/Tremflex 834.
3) Substitutions: Refer to Section 01 25 00.

2. Air Seals: Provide non-staining and non-bleeding sealers, calks, or foams appropriate to specific applications for filling openings between conditioned and unconditioned spaces.

a. Type: As recommended by manufacturer for each specific application; compatible with adjacent materials.

b. Manufacturers:

1) Dow/Great Stuff.
2) Owens Corning/EnergyComplete Air Sealant.
3) Hilti/Foam Filler CF 812.
4) Substitutions: Refer to Section 01 25 00.

c. Pest Control Mesh: Openings subject to pest infiltration to have 304 stainless steel wool, material stuffed in joint before application of air seals using methods to ensure blocking of gap from pests.

d. Exception: Annular spaces around pipes, electric cables, conduits and other openings in exterior walls shall be protected against passage of rodents by closing with cementitious grout.

1) Cementitious Grout: ASTM C1107 non-shrink, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

F. Miscellaneous Materials:

1. Primers/Sealers: Non-staining types recommended by joint sealer manufacturer for joint surfaces to be primed or sealed.

2. Joint Cleaners: Non-corrosive types recommended by joint sealer manufacturer; compatible with joint forming materials.

3. Bond Breaker Tape: Polyethylene tape as recommended by joint sealer manufacturer where bond to substrate or joint filler must be avoided for proper performance of joint sealer.

4. Sealant Backer Rod: Compressible polyethylene foam rod or other flexible, permanent, durable non-absorptive material as recommended by joint sealer manufacturer for compatibility with joint sealer.

    a. Oversize backer rod minimum 30% to 50% of joint opening.

G. Colors: As indicated, as selected by Architect from manufacturer's full range of colors where not indicated.

1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare joint surfaces in accordance with ASTM C1193 and as recommended by joint sealer manufacturer.

B. Clean joint surfaces immediately before installation of joint sealer; remove dirt, insecure materials, moisture and other substances which could interfere with bond of joint sealer.

C. Prime or seal joint surfaces where recommended by joint sealer manufacturer; do not allow primer/sealer to spill or migrate onto adjoining surfaces.

D. Ensure protective coatings on surfaces in contact with joint sealers have been completely stripped.

3.2 INSTALLATION

A. Comply with manufacturer's printed instructions and ASTM C1193, except where more stringent requirements are shown or specified.

B. Pest Control: Install stainless steel wool prior to application of backer rods and bond breakers at air seal and as required to ensure complete pest blockage at joints where pest intrusion is a potential.

C. Set sealant backer rods at proper depth or position in joint to coordinate with other work, including installation of bond breakers and sealant; do not leave voids or gaps between ends of backer rods.

1. Do not stretch, twist, puncture or tear backer rods.

D. Install bond breaker tape as required to avoid three-sided bond of sealant to substrate and where required by manufacturer's recommendations to ensure joint sealers will perform properly.

E. Size materials to achieve required width/depth ratios.

F. Employ installation techniques that will ensure joint sealers are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of bond surfaces equally on opposite sides.

G. Joint Configuration: Fill sealant joint to a slightly concave surface, slightly below adjoining surfaces, unless otherwise indicated.

H. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture or dirt.

I. Install joint sealers to depths recommended by joint sealer manufacturer but within the following general limitations, measured at center (thin) section of bead.

1. Horizontal Joints: 75% width with minimum depth of 3/8".
2. Elastomeric Joints: 50% width with minimum depth of 1/4".
3. Non-Elastomeric Joints: 75% to 125% of joint width.

J. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.

1. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

K. Cure joint sealers in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.

L. Maintain finished joints free of embedded matter, ridges and sags.

END OF SECTION

SECTION 08 11 10

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide full flush steel (hollow metal) doors and pressed steel frames, including anchors and silencers.

1. Pressed steel frames include both door and window framing.

B. Related Sections:
1. Section 08 71 00: Door hardware.
2. Section 08 80 00: Glazing.

1.2 REFERENCES

A. Steel Door Institute (SDI): SDI-100 (ANSI/SDI A250.8) - Recommended Specifications - Standard Steel Doors and Frames.

B. National Association of Architectural Metal Manuf. (NAAMM): Hollow Metal Manual.

C. Underwriters Laboratories: Standards as applicable to fire rated doors and frames.

1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate hardware installation with Section 08 71 00 – Door Hardware.

2. Coordinate glass installation with Section 08 80 00 - Glazing.

1.4 SUBMITTALS

A. Product Data: Submit manufacturers' literature.

B. Shop Drawings: Indicate general construction, configuration, jointing methods, reinforcement, anchorage methods, hardware locations, and locations of cut-outs.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Amweld Building Products Inc.

B. Ceco Door Division Assa Abloy Door Group.

C. Curries Division Assa Abloy Door Group.

D. Door Components, Inc.

E. Republic Doors and Frames.

F. Krieger Steel Products Co.

G. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide full flush steel (hollow metal) doors and pressed steel frames, including anchors and silencers.

B. Doors: Hollow metal flush steel door, 1-3/4" thick.

1. Typical: Full flush with steel channel or welded edge; close top with flush end closer treatment, bottom optional flush or recessed channel; steel stiffened core, insulated at exterior doors; continuous welded seam.

2. Interior Doors: Minimum 0.042” (18-gage).

3. Exterior Doors: Minimum 0.053” (16-gage).

4. Glazed and Louver Doors: Provide systems as indicated on Drawings.

C. Frames:

1. Exterior Frames: Welded (pre-assembled) type.

2. Gage: Minimum 0.053” (16-gage) interior frames, 0.067” (14-gage) exterior frames.

3. Door Silencers: Manufacturer's standard resilient type; removable for replacement.

D. Glazing Stops: Full flush type with glass centered in opening, unsecured side integral with unit, secured side fastened with flush, countersunk Allen type fasteners; minimum 0.053” (16-gage).

2.3 FABRICATION

A. Conform to requirements of SDI (ANSI A250 Series) or NAAMM.

B. Reinforce and prepare doors and frames to receive hardware.

1. Refer to Section 08 71 00 for hardware requirements.

C. Frames:

1. Welded Frames: Accurately form and cut mitered corners of welded type frames; continuously weld on inside surfaces (fully welded); grind welded joints to smooth uniform finish.

2. Head Reinforcement: Reinforce frames wider than 4'-0" with minimum 0.093” (12 gage) formed steel channels welded in place, flush with top of frames.

3. Doors at Glazed Panels: Reinforce jambs and heads of frames for doors which occur adjacent to glazed sidelights and partitions.

D. Door Silencers:

1. Place three single bumpers on single door frames; space equally along strike jambs.

2. Place two single bumpers on double door frames; place on frame heads.

3. Place three single bumpers for each door on door frames with removable mullions, spaced equally along strike jambs, and in addition place two single bumpers on frame heads to cushion door when mullion is removed.

E. Provide jamb anchors per SDI-100 (ANSI/SDI 250.8) and NAAMM; weld floor jamb anchors in place.

F. Edge Clearances:

1. Between Doors and Frames: Maximum 1/8" at head and jambs.
2. Door Sills (No Threshold): Maximum 1/2".
3. Door Sills (Threshold): Maximum 3/8" above finished floor.
4. Between Edges of Pairs of Doors: Maximum 1/8".
5. Fire Rated Doors: As required for fire ratings.

G. Finish: Comply with requirements of Section 09 90 00 – Painting and Coating for primer including application and compatibility with specified finishes.

1. Exterior Exposed Units: Apply minimum A60 non-spangle galvanized coating, ASTM A924 and A653.

a. Surface treat after galvanizing to remove oils and prepare for painting and apply one coat of primer; comply with requirements in Section 09 90 00.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors and frames in accordance with SDI-100 (ANSI/SDI A250.8) and ANSI/SDI A250.11 or NAAMM "Hollow Metal Manual" and with manufacturer's recommendations and installation instructions.

1. Install fire rated units in conformance with fire label requirements and NFPA 80.

B. Install doors and frames plumb and square within 1/16”, and with maximum diagonal distortion of 1/32".

C. Remove and replace doors and frames damaged during delivery, storage, installation and construction.

1. Paste filler repair shall not be permitted.

D. After installation, touch-up scratched paint surfaces.

END OF SECTION

SECTION 08 33 00

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide overhead coiling (roll-up) door systems with curtains, guides, counterbalance, hardware, and accessories as required for complete, operational installation.

1. Provide electrical wiring from make-up box to electrical operators and control stations at electrically operated units.

B. Related Sections:

1. Section 05 50 00: Steel frames at openings.

2. Division 26: Electrical service to make-up box located on electric door operators; empty conduit from control stations to door operators.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Shop Drawings: Indicate pertinent dimensioning, general construction, component connections and details, anchorage methods, and hardware locations.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Cornell Iron Works.

B. The Cookson Co.

C. Overhead Door Corp.

D. Wayne Dalton Corp.

E. Raynor Garage Doors.

F. Windsor Door.

G. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide overhead coiling (roll-up) door systems with curtains, guides, counterbalance, hardware, and accessories.

B. Regulatory Requirements (Fire Rated Doors): Where indicated provide assemblies that comply with NFPA 80, tested in accordance with ASTM E152, and listed in Underwriters Laboratories (UL) Building Materials Directory, and bearing UL label.

1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

2. Oversized Doors: Doors exceeding 120-sf or 24-feet in any length, shall have UL "Certificate of Inspection for Oversize Doors", in lieu of label.

C. Design Criteria

1. Exterior Doors: Design and reinforce to withstand loads as required by applicable codes but not less than minimum 20-psf positive and 15-psf negative wind force.

D. Overhead Coiling Doors: Fabricate doors of continuous length for width of door without splices.

1. Electrically Operated Doors: Provide complete assembly with electric motor sized as recommended by door manufacturer for size and application indicated.

a. Power Failure Backup: Provide overhead concealed crank socket for operation in case of power failure; provide removable crank.

E. Components:

1. Curtain: Flat-faced interlocking slats, ends of alternate slats fitted with end locks; bottom fitted with angles to provide reinforcement and positive contact with floor when curtain is closed.

a. Slats: Galvanized steel; ASTM A653, Grade A, with G90 zinc coating, ASTM A924 and A653, phosphate treated before fabrication.

b. Slats: Aluminum; ASTM B221, alloy 6063.

2. Curtain Guides: Formed steel angles of required sizes and configurations.

3. Roller Shaft (Counterbalance): Steel pipe and helical steel spring system capable of producing torque to assure easy operation of curtain from any position; adjustable spring tension.

4. Housing: Minimum 24-gage steel, internally reinforced to maintain rigidity and form.

5. Weatherstripping (Exterior Doors): Waterproof and rotproof, resilient type; located along jamb edges, bottom of curtain, and within housing.

6. Metal Finish: Hot dip galvanize minimum G90 and prime paint; do not shop prime surfaces in contact with concrete or requiring field welding; shop prime in one coat; comply with requirements of Section 09 90 00 – Painting and Coating.

a. Touch up field welds with zinc-rich primer.

b. Other methods of providing protective zinc coating on steel surfaces comparable to G90 hot dip galvanizing will be acceptable.

F. Hardware: Manufacturer's standard hardware for door types specified.

1. Locks: Cylindrical.

a. Keying: Keyed in accordance with Section 08 71 00 – Door Hardware.

G. Electric Operators: UL approved; minimum 3/4 HP Class A insulated electric motor; fully enclosed magnetic cross-line reversing starter; with overload protection; voltage as indicated on Electrical Drawings.

1. Speed: Minimum 2/3' per second, maximum 1' per second.

2. Control Station: Standard three-button (open-close-stop) type, for each electric operator; 24-volt circuit; flush mounted.

3. Control Station: Key operated (open-close-stop) type, for each electric operator, 24-volt circuit, flush mounted.

a. Cylinders: Provided in Section 08 71 00 – Door Hardware.

4. Brake System: Adjustable friction clutch double-shoe brake system actuated by independent full line voltage solenoid controlled by motor starter.

5. Safety Switches: Located at bottom of doors, full width; electromechanical type; wired to stop or reverse door upon striking object; neoprene covered to provide weather seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install overhead coiling doors, complete, in accordance with manufacturer's instructions and recommendations.

1. Install fire rated doors in accordance with requirements for indicated fire label and NFPA Bulletin No. 80.

2. Coordinate installation of electric operators and controls with electrical service.

B. Fit, align, lubricate, and adjust complete door assembly level and plumb. Provide smooth operation.

3.2 FIELD QUALITY CONTROL

A. Test door closing systems operation by smoke detector fire release system.

END OF SECTION

SECTION 08 51 10

ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide aluminum windows with integral flashing, glazing, and accessories as required for complete weather-tight installation.

B. Related Work:

1. Section 07 90 00: Perimeter joint sealers and back-up material.

1.2 REFERENCES

A. American Architectural Manufacturers Association (AAMA) and Window and Door Manufacturers Association (WDMA), AAMA/WDMA 101/I.S. 2, Voluntary Specifications for Aluminum, Vinyl (PVC), and Wood Window and Glass Doors.

B. Glass Association of North America (GANA): Glazing Manual.

C. National Association of Architectural Metal Manuf. (NAAMM): Metal Finishes Manual.

1.3 SUBMITTALS

A. Product Data: Submit manufacturers' literature including test results indicating compliance with design criteria.

B. Shop Drawings: Indicate pertinent dimensioning, general construction, component connections and locations, anchor methods and locations.

C. Samples: Furnish samples of metal finish and glass.

D. Test Reports: Include laboratory test results for STC and OITC rating of units.

1.4 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with *CAL*Green requirements including those relative to energy efficiency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack units on edge on wood strips above ground.

1.6 WARRANTY

A. Extended Correction Period: Extend correction period to two years.

1. Provide for correcting failure of Sound Transmission Coefficient rating (STC).

2. Provide for correcting failure of insulating glass. Failure includes signs of moisture on interior surfaces of insulated glass units and bond failure of laminated glass.

3. Repair or replace systems and materials which fail to perform as intended.

B. Manufacturer’s Warranty: Submit manufacturer’s warranty including special manufacturer services as required for manufacturer’s warranty.

1. Period: 20 years.

2. Manufacturer's warranty shall not detract from requirements of extended correction period nor from Owner’s rights under implied and expressed warranties regardless of wording of manufacturer’s warranty.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Kawneer, an Arconic Company.

B. EFCO Corporation.

C. U.S. Aluminum Division, C.R. Laurence Company, Inc.

D. Arcadia, Inc.

E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide quality aluminum windows with glazing, hardware, and accessories as indicated.

1. Manufacturer: Provide each type of window by single manufacturer. Provide all windows by single manufacturer where all types are available from approved manufacturer.

2. Standards: Conform to AAMA/WDMA 101/I.S.2, types as indicated.

A. Regulatory Requirements: Comply with California Building Code.

1. Safety Glass Standards: Comply with California Building Code and CPSC 16 CFR 1201, and pass ANSI Z97.1.

2. Energy Requirements: Comply with California Energy Commission requirements regarding energy performance of windows.

a. Manufacturer shall be responsible for providing information required by authorities necessary to verify conformance.

b. Entire assembly, including glass and glazing, shall be certified by National Fenestration Rating Council (NFRC) and shall bear NFRC Label indicating energy performance technical information.

B. Performance Requirements: Comply with applicable codes and AAMA 101 for each type of window specified, but no less than as required for Performance Class listed.

1. Structural: Withstand code required wind loads on exterior and on interior when tested in accordance with ASTM E330, without breakage, failure, or malfunction of operation.

2. Forced Entry: Provide systems conforming to ASTM F588 for windows, Performance Level 10 or AAMA 1302.5 where at ground floor and at areas accessible from decks and accessible rooftops.

3. Acoustical Ratings: Provide windows that have been tested under ASTM E90 with minimum Sound Transmission Class (STC) rating and Outdoor Indoor Transmission Class (OITC) ratings as indicated on Drawings.

4. Label: "AAMA Quality Certified" label is required on each window.

C. Aluminum Windows: Provide units meeting requirements of Architectural Aluminum Manufacturers Association (AAMA) Certification Program.

1. Performance Class: Not less than AAMA -CW (Commercial).

a. Provide windows and doors meeting AAMA/WDMA 101/I.S.2 performance class as required to comply with California Building Code wind loads as listed in Chapter 16.

D. Aluminum: Of sizes, shapes and profiles shown; alloys and tempers as recommended by manufacturer and processor to comply with requirements for performance, fabrication, and finish application.

1. Thermal Breaks: Provide units with thermal breaks in metal to prevent transfer of temperature between interior and exterior surfaces; conform to AAMA 1502 with factor of 45.

2. Painted Finish: Provide manufacturer’s standard thermoset or powder coat finish as approved by Architect.

a. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

3. High Performance Organic Coating Finish: AA-C12C42R1x, prepared, pretreated, and coated with minimum two coat Kynar 500 or Hylar 5000 system; AAMA 2605.

a. Color: As indicated, as selected by Architect from manufacturer’s full range of non-metallic colors where not otherwise indicated.

4. High Performance Organic Coating Finish: AA-C12C42R1x, prepared, pretreated, and coated with minimum two coat system; AAMA 2605.

    a. PVDF Manufacturers:

        1) Arkema Group/Kynar 500.
        2) Solvay/Hylar 5000.
        3) Substitutions: Refer to Section 01 25 00.

    b. Paint Manufacturers:

        1) PPG Industries.
        2) Valspar Corp.
        3) Akzo Nobel.
        4) Substitutions: Refer to Section 01 25 00.

    c. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect including metallic based on mica.

5. Protect finishes with manufacturer recommended methods.

E. Glass:

1. Typical: ASTM C1036, select glazing quality clear float glass; thickness nominal 1/4".

2. Insulated Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with -20 degree F dew point.

    a. Performance: Certified to ASTM E2190 by Insulating Glass Certification Council.

    b. System: Manufacturer's standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.

    c. Glass: ASTM C1036, select glazing quality clear float glass; nominal thickness 1/4”.

        1) Safety Glass: ASTM C1048, Kind FT, fully tempered select glazing quality glass; provide where required by applicable codes and regulations; pass ANSI Z97.1.

    d. Low E Coating: High performance low emissivity coating comparable to Vitro (PPG)/SolarBan 60 on No. 2 surface.

    e. Total Unit Thickness: 1".

F. Glazing Materials: Manufacturer standard type to suit locations and applications.

G. Miscellaneous Materials:

1. Fasteners: Anodized aluminum or non-magnetic stainless steel of type not causing electrolytic action or corrosion; provide flush Phillips flat-head or Allen screws where exposed.

2. Finish exposed aluminum fasteners to match aluminum work.

3. Brackets and Reinforcements: Aluminum wherever possible, where steel units are required for higher strength or other unavoidable necessity, hot-dip galvanize after fabrication; ASTM A123 G-90.

4. Bituminous Paint: Cold applied asphalt mastic complying with SSPC-Paint 12, compounded for 30-mil thickness per coat.

H. Weather-Stripping:

1. Sliding Panels: Double woven pile complying with AAMA 2605.

2. Projecting and Fixed Panels: Neoprene gaskets complying with ASTM D2000, Designations 2BC415 to 3BC620.

I. Hardware: Manufacturer's standard secure hardware as approved by Architect; fabricated from aluminum, stainless steel, or corrosion resistant material compatible with aluminum; conform to AAMA 101.

1. Operable Units: Deadlock latch mechanism, constructed to prevent accidental lockout and accidental damage if closed in locked position;

a. Include feature to permit locking operable windows in 4" open position.

J. Screens: Provide manufacturer's standard screens for windows and conforming to ANSI/SMA 2005; frames finished to match windows.

2.3 FABRICATION

A. Fabricate units to allow for clearances and shim spacing around perimeter to enable installation; provide for thermal movement and slope and weep sills for drainage.

B. Provide anchorage devices to securely and rigidly fit windows in place.

C. Accurately fit together joints and corners; match components ensuring continuity of line and design; ensure joints and connections are flush, hairline and weatherproof.

D. Apply coat of bituminous paint on concealed aluminum surfaces to be in contact with cementitious or dissimilar materials.

E. Glass Installation: Conform to requirements in GANA "Glazing Manual"; glass shall not touch metal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine surfaces of openings and verify dimensions.

B. Installation of units constitutes acceptance of existing conditions.

3.2 INSTALLATION

A. Assemble and anchor various components to allow for expansion and contraction, maintaining weather-tight condition.

B. Install units in strict compliance with manufacturer's recommendations and installation instructions.

C. Install work plumb, straight, square, level and in their proper elevation, plane and location, and in proper alignment with other work.

D. Anchor securely in place, separate aluminum and other corrodible metal surfaces from corrosion and electrolytic action with other materials.

E. Upon completion of installation, remove protective coatings or coverings and clean aluminum surfaces.

F. Adjust hardware for proper operation.

1. Windows to operate freely and smoothly, with maximum operating pressure of 5-pounds.

3.3 CLEANING

A. Clean windows including glazing using methods recommended by window manufacturer; minimum wash down with solution of mild detergent in warm water applied with soft, clean cloths.

1. Take care to remove dirt from corners.
2. Wipe surfaces clean.

3.4 PROTECTION

A. Protect units and glazing from damage from construction operations and from vandalism.

B. Repair or replace damaged metal components. Touch-up damaged finishes.

C. Remove and replace glass that is broken, chipped, cracked, abraded or damaged during construction period, including natural causes, accidents and vandalism.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Door hardware, including electric hardware.
2. Gate Hardware.
3. Cylinders for doors fabricated with locking hardware.

B. Related Divisions:

1. Division 06 – door hardware installation
2. Division 07 – sealant at exterior thresholds
3. Division 08 – metal doors and frames, integrated security systems
4. Division 21 – fire and life safety systems
5. Division 28 – security access systems

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Conduit, junction boxes & wiring.
8. Folding partitions, except cylinders where detailed
9. Sliding aluminum doors, except cylinders where detailed.
10. Access doors and panels, except cylinders where detailed.
11. Corner Guards.

1.2 REFERENCES**:**

A. Use date of standard in effect as of Bid date.

1. American National Standards Institute

a) ANSI 156.18 – Materials and Finishes.
b) ICC/ANSI A117.1 - 2009 – Specifications for making buildings and facilities usable by physically handicapped people. [omit for CA work – not applicable]

2. BHMA – Builders Hardware Manufacturers Association
3. 2019 California Building Code

a) Chapter 11B – Accessibility To Public Buildings, Public Accommodations, Commercial Buildings and Public Housing

4. DHI – Door and Hardware Institute
5. NFPA – National Fire Protection Association
   a) NFPA 80 2016 Edition – Standard for Fire Doors and Other Opening Protectives.
   b) NFPA 105 – Smoke and Draft Control Door Assemblies
   c) NFPA 252 – Fire Tests of Door Assemblies
6. UL – Underwriters Laboratories
   a) UL10C – Positive Pressure Fire Tests of Door Assemblies.
   b) UL 305 – Panic Hardware
7. WHI – Warnock Hersey Incorporated State of California Building Code
8. Local applicable codes
9. SDI – Steel Door Institute
10. WI – Woodwork Institute
11. AWI – Architectural Woodwork Institute
12. NAAMM – National Association of Architectural Metal Manufacturers

B. Abbreviations

1. Manufacturers**:** see table at 2.1.A of this section
2. Finishes**:** see 2.7 of this section.

1.3 SUBMITTALS & SUBSTITUTIONS

A. SUBMITTALS**:** Submit six copies of schedule per D. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Minimum 10pt font size. Include following information**:**

1. Type, style, function, size, quantity and finish of hardware items.
2. Use BHMA Finish codes per ANSI A156.18.
3. Name, part number and manufacturer of each item.
4. Fastenings and other pertinent information.
5. Location of hardware set coordinated with floor plans and door schedule.
6. Explanation of abbreviations, symbols, and codes contained in schedule.
7. Mounting locations for hardware.
8. Door and frame sizes, materials and degrees of swing.
9. List of manufacturers used and their nearest representative with address and phone number.
10. Catalog cuts.
11. Point-to-point wiring diagrams.
12. Manufacturer’s technical data and installation instructions for electronic hardware.

B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.

C. Deviations**:** Highlight, encircle or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.

D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.

E. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.

F. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.

G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, riser and point-to-point wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.4 QUALITY ASSURANCE**:**

A. Hardware**:** Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.

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

C. Fire-Rated Openings**:** NFPA 80 compliant. Hardware UL10C (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.

D. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions and code requirements.

1.5 DELIVERY, STORAGE AND HANDLING**:**

A. Delivery**:** coordinate delivery to appropriate locations (shop or field).

1. Permanent keys and cores**:** secured delivery direct to Owner's representative.

B. Acceptance at Site**:** Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.

C. Storage**:** Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS AND COORDINATION**:**

A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.

B. Coordination**:** Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information**:**

1. Location of embedded and attached items to concrete.
2. Location of wall-mounted hardware, including wall stops.
3. Location of finish floor materials and floor-mounted hardware.
4. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
5. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
6. Coordinate: low-voltage power supply locations.
7. Coordinate: back-up power for doors with automatic operators.
8. Coordinate: flush top rails of doors at outswinging exteriors, and throughout where adhesive-mounted seals occur.
9. Manufacturers' templates to door and frame fabricators.

C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

D. Environmental considerations**:** segregate unused recyclable paper and paper product packaging, uninstalled metals, and plastics, and have these sent to a recycling center.

1.7 WARRANTY**:**

A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties.

B. Include factory order numbers with close-out documents to validate warranty information, required for Owner in making future warranty claims:

C. Minimum warranties:

1.	Locksets**:**	Three years
2.	Extra Heavy Duty Cylindrical Lock:	Seven Years
3.	Exit Devices**:**	Three years mechanical One year electrical
4.	Closers**:**	Thirty years mechanical Two years electrical
5.	Hinges**:**	One year
6.	Other Hardware	Two years

1.8 COMMISSIONING**:**

A. Conduct these tests prior to request for certificate of substantial completion**:**

1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

1.9 REGULATORY REQUIREMENTS**:**

A. Locate latching hardware between 34 inches to 44 inches above the finished floor, per 2019 California Building Code, Section 11B-404.2.7.

1. Panic hardware: locate between 36 inches to 44 inches above the finished floor.

B. Handles, pull, latches, locks, other operable parts**:**

1. Readily openable from egress side with one hand and without tight grasping, tight pinching, or twisting of the wrist to operate. 2019 California Building Code Section 11B-309.4.
2. Force required to activate the operable parts: 5.0 pounds maximum, per 2019 California Building Code Section 11B-309.4.

C. Adjust doors to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2019 California Building Code Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds.

1. Exception: exterior doors' pressure-to-open may be increased to 8.5-pounds if: at a single location, and one of a bank of eight leafs or fraction of eight, and one leaf of this bank is fitted with a low- or high-energy operator.

D. Low-energy powered doors: comply with ANSI/BHMA A156.19. Reference: 2019 California Building Code Section 11B-404.2.9.

1. Where powered door serves an occupancy of 100 or more, provide back-up battery power or stand-by generator power, capable of supporting a minimum of 100 cycles.
2. Actuators, vertical bar type: minimum 2-inches wide, 30-inches high, bottom located minimum 5-inches above floor or ground, top located minimum 35-inches above floor or ground. Displays International Symbol of Accessibility, per 2019 California Building Code Section 11B-703.7.
3. Actuators, plate type: use two at each side of the opening. Minimum 4-inches diameter or 4-inches square. Displays International Symbol of Accessibility, per 2019 California Building Code Section 11B-703.7. Locate centerline of lower plate between 7- and 8-inches above floor or ground, and upper plate between 30- and 44-inches above floor or ground.
4. Actuator location: conspicuously located, clear and level floor/ground space for forward or parallel approach.

E. Adjust door closer sweep periods so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per 2019 California Building Code Section 11B-404.2.8.

1. Spring hinges: adjust for 1.5 seconds minimum for 70 degrees to fully-closed.

F. Smooth surfaces at bottom 10 inches of push sides of doors, facilitating push-open with wheelchair footrests, per 2019 California Building Code Section 11B-404.2.10.

1. Applied kickplates and armor plates: bevel the left and right edges; free of sharp or abrasive edges.
2. Tempered glass doors without stiles: bottom rail may be less than 10 inches if top leading edge is tapered 60 degrees minimum.

G. Door opening clear width no less than 32 inches, measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 30 inches and below 80 inches, and the hardware projects no more than 4 inches. 2019 California Building Code Section 11B-404.2.3.

1. Exception: doors not requiring full passage through the opening, that is, to spaces less than 24 inches in depth, may have the clear opening width reduced to 20 inches. Example: shallow closets.
2. Door closers and overhead stops: not less than 78 inches above the finished floor or ground, per 2019 California Building Code 11B-307.4.

H. Thresholds**:** floor or landing no more than 0.50 inches below the top of the threshold of the doorway, per 2019 California Building Code Section 11B-404.2.5. Vertical rise no more than 0.25 inches, change in level between 0.25 inches and 0.50 inches**:** beveled to slope no greater than 1**:**2 (50 percent slope). 2019 California Building Code Section 11B-303.2 & ~.3.

I. Floor stops**:** Do not locate in path of travel. Locate no more than 4 inches from walls, per DSA Policy #99-08 (Access).

J. Pairs of doors with independently-activated hardware both leafs**:** limit swing of right-hand or right-hand-reverse leaf to 90 degrees to protect persons reading wall-mounted tactile signage, per 2019 California Building Code Section 11B-703.4.2.

K. Door and door hardware encroachment**:** when door is swung fully-open into means-of-egress path, the door may not encroach/project more than 7 inches into the required exit width, with the exception of door release hardware such as lockset levers or panic hardware. These hardware items must be located no less than 34-inches and no more than 48-inches above the floor/ground. 2019 California Building Code, Section 1005.7.1.

2. In I-2 occupancies, surface mounted latch release hardware, mounted to the side of the door facing away from the adjacent wall where the door I sin the open position, is not exempt from the inclusion in the 7-inch maximum encroachment, regardless of its mounting height, per 2019 California Building Code, Section 1005.7.1 at Exception 1.

L. New buildings that are included in public schools (kindergarten through 12th grade) state funded projects and receiving state funding pursuant to Leroy F. Green, School Facilities Act of 1998, California Education Code Sections 17070.10 through 17079, and that are submitted to the Division of the State Architect for plan review after July 1, 2011 in accordance with the Education Code 17075.50, shall include locks that allow doors to classrooms and any room with an occupancy of five or more persons to be locked from the inside. The locks shall conform to the specification and requirements found in Section 1010.1.9. 2019 California Building Code Section 1010.1.11

Exceptions:

1. Doors that are locked from the outside at all times such as, but not limited to, janitor's closet, electrical room, storage room, boiler room, elevator equipment room and pupil restroom.

2. Reconstruction projects that utilize original plans in accordance with California Administrative Code, Section 4-314.

3. Existing relocatable buildings that are relocated within same site in accordance with California Administrative Code, Section 4-314.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Listed acceptable alternate manufacturers: these will be considered; submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE ALTERNATE:
Hinges	(IVE) Ives	Bommer
Continuous Hinges	(IVE) Ives	Select
Key System	(SCH) Schlage	Owner standard
Mechanical Locks	(SCH) Schlage	Owner standard
Electronic Locks	(SCE) Schlage Electronics	Owner standard
Exit Devices	(VON) Von Duprin	Owner standard
Closers	(LCN) LCN	Owner standard
Auto Flush Bolts	(IVE) Ives	DCI
Coordinators	(IVE) Ives	DCI
Silencers	(IVE) Ives	Rockwood, Trimco
Push & Pull Plates	(IVE) Ives	Rockwood, Trimco
Kickplates	(IVE) Ives	Rockwood, Trimco
Stops & Holders	(IVE) Ives	Rockwood, Trimco
Overhead Stops	(GLY) Glynn-Johnson	ABH
Thresholds	(ZER) Zero	NGP, Pemko
Seals & Bottoms	(ZER) Zero	NGP, Pemko
Key Cabinets	(LUN) Lund	TelKee

2.2 HINGING METHODS:

A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

C. Conventional Hinges**:** Steel or stainless steel pins and approved bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.

1. Outswinging exterior doors**:** non-ferrous with non-removable (NRP) pins and security studs.
2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

2.4 EXIT DEVICES / PANIC HARDWARE

A. General features**:**

1. Independent lab-tested 1,000,000 cycles.
2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
3. Deadlocking latchbolts, 0.75 inch projection.
4. End caps**:** impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
5. No exposed screws to show through glass doors.
6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
7. Releasable in normal operation with 15-pound maximum operating force per UBC Standard 10-4, and with 32-pound maximum pressure under 250-pound load to the door.
8. Exterior doors scheduled with XP-series devices**:** Static load force resistance of at least 2000 pounds.
9. Accessibility: Require not more than 5 lb to retract the latchbolt, per CBC 2019 11B-404.2.7 and 11B-309.4.
    a) Mechanical method: Von Duprin "AX-" feature, where touchpad directly retracts the latchbolt with 5 lb or less of force. Provide testing lab certification confirming that the mechanical device is independent third-party tested to meet this 5 lb requirement.
    b) Electrical method: Von Duprin's "RX-QEL-", where lightly pressing the touchpad with 5 lb or less of force closes an electric switch, activating quiet electric latch retraction.

B. Specific features**:**

1. Non-Fire Rated Devices**:** cylinder dogging.
2. Lever Trim**:** breakaway type, forged brass or bronze escutcheon min. 0.130 inch thickness, compression spring drive, match lockset lever design.
3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.

4. Fire-Labeled Devices**:** UL label indicating “Fire Exit Hardware”. Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
5. Inpact recessed devices**:** 1.25 inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
6. Delayed Egress Devices**:** Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 “Special Locking Arrangement” compliant.
7. Electrically Operated Devices**:** Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
8. Removable Mullions**:** Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.

2.6 CLOSERS

A. Surface Closers**:**

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Adjust doors to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2019 California Building Code Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds.

    a) Exception: exterior doors’ pressure-to-open may be increased to 8.5-pounds if: at a single location, and one of a bank of eight leafs or fraction of eight, and one leaf of this bank is fitted with a low- or high-energy operator.

7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
9. Exterior door closers**:** tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
10. Exterior doors**:** seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
11. Non-flaming fluid, will not fuel door or floor covering fires.
12. Pressure Relief Valves (PRV) not permitted.

2.7 OTHER HARDWARE

A. Kick Plates**:** Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

B. Door Stops**:** Provide stops to protect walls, casework or other hardware.

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum**:** 90deg stop / 95deg deadstop. Note degree of opening in submittal.

C. Thresholds**:** As scheduled and per details. Comply with CBC 2019 11B-404.2.5. Substitute products**:** certify that the products equal or exceed specified material's thickness. Proposed substitutions**:** submit for approval.

1. Saddle thresholds**:** 0.125 inches minimum thickness.
2. Exteriors**:** Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Minimum 0.25 inch diameter fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors. National Guard Products' "COMBO" or Pemko Manufacturing's "FHSL".
3. Fire-rated openings, 90-minutes or less duration**:** use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, include a 0.25in high 5in wide saddle in the bid, and request direction from Architect.
4. Fire-rated openings, 3-hour duration**:** Thresholds, where scheduled, to extend full jamb depth.
5. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
6. Fasteners**:** Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws**:** full-thread. Sleeve nuts**:** full length to prevent door compression.

D. Through-bolts**:** Do not use. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.

1. Exception**:** surface-mounted overhead stops, holders, and friction stays.

E. Silencers**:** Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Leave no unfilled/uncovered pre-punched silencer holes. Intent**:** door bears against silencers, seals make minimal contact with minimal compression – only enough to effect a seal.

2.8 FINISH**:**

A. Generally**:** BHMA 626 Satin Chromium.

1. Areas using BHMA 626: furnish push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise scheduled.

B. Door closers**:** factory powder coated to match other hardware, unless otherwise noted.

2.9 KEYING REQUIREMENTS**:**

A. Key System**:** Schlage Everest high-security utility-patented keyway, interchangeable core throughout. Utility patent protection to extend at least until 2014. Key blanks available only from factory-direct sources, not available from after-market keyblank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system keyway(s), keybow styles, structure, stamping, degree of physical security and degree of geographic exclusivity. Furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner. Owner/ will install permanent cylinders/cores.

1. Existing factory-registered master key system.
2. Construction keying**:** furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.
3. Temporary cylinders/cores remain supplier's property.
4. Furnish 10 construction keys.
5. Furnish 2 construction control keys.
6. Furnish 2 Emergency keys per each L9485 Faculty Restroom Lock
7. Key Cylinders**:** furnish 6-pin solid brass construction.

B. Cylinders/cores**:** keyed at factory of lock manufacturer where permanent records are maintained. Locksets and cylinders same manufacturer.

C. Permanent keys**:** use secured shipment direct from point of origination to Owner.

1. For estimate**:** 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
2. For estimate**:** VKC stamping plus "DO NOT DUPLICATE".

D. Bitting List**:** use secured shipment direct from point of origination to Owner at completion.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS**:**

A. Can read and understand manufacturers' templates, suppliers' hardware schedule and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION**:**

A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation. Installation denotes acceptance of wall/frame condition.

A. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.

1. Notify Architect of code conflicts before ordering material.
1. Locate latching hardware between 34 inches to 44 inches above the finished floor, per California Building Code, Section 1010.1.9.2 and 11B-404.2.7.
2. Locate panic hardware between 36 inches to 44 inches above the finished floor.
3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.

B. Overhead stops**:** before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.

1. Gaskets**:** install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
4. Replace fasteners damaged by power-driven tools.

B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.

C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.

D. Locate overhead stops for minimum 90 degrees at rest and for maximum allowable degree of swing.

E. Drill pilot holes for fasteners in wood doors and/or frames.

F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

3.4. ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

1. Hardware damaged by improper installation or adjustment methods**:** repair or replace to Owner's satisfaction.
2. Adjust doors to fully latch with no more than 1 pound of pressure.

a) Door closer valves: turn valves clockwise until at bottom – do not force. Turn valves back out one and one-half turns and begin adjustment process from that point. Do not force valves beyond three full turns counterclockwise.

3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
4. Adjust door closers per 1.9 this section.

B. Fire-rated doors**:**

1. Wood doors**:** adjust to 0.125 inches clearance at heads, jambs, and meeting stiles.
2. Steel doors**:** adjust to 0.063 inches minimum to 0.188 inches maximum clearance at heads, jambs, and meeting stiles.
3. Adjust wood and steel doors to 0.75 inches maximum clearance (undercut) above threshold or finish floor material under door.

C. Final inspection**:** Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following**:**

1. Has re-adjusted hardware.
2. Has evaluated maintenance procedures and recommend changes or additions, and instructed Owner's personnel.
3. Has identified items that have deteriorated or failed.
4. Has submitted written report identifying problems.

3.5 DEMONSTRATION**:**

A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING**:**

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.

B. Clean adjacent wall, frame and door surfaces soiled from installation / reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

A. See door schedule in drawings for hardware set assignments.

B. Do not order material until submittal has been reviewed, stamped, and signed by Architect's door hardware consultant.

OVERTUR 75944 V1 / OPT0285907

HARDWARE GROUP NO. 1

For use on Door #(s):

101 102 103 104

Provide each RU door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

ALL HARDWARE BY DOOR MANUFACTURER

HARDWARE GROUP NO. 2

For use on Door #(s):

105

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-L-NL-06-SNB	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 36-083 (@ DOGGING)	626	SCH
2	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	328AA-S	AA	ZER
1	EA	THRESHOLD	THRESHOLD AS DETAILED		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	MOUNTING BRACKET	328SPB		ZER

6 PIN EVEREST T145 KEYWAY REQUIRED

HARDWARE GROUP NO. 2A

For use on Door #(s):

106

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-L-NL-06-SNB	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 36-083 (@ DOGGING)	626	SCH
2	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	GASKETING	328AA-S	AA	ZER
1	EA	THRESHOLD	THRESHOLD AS DETAILED		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	MOUNTING BRACKET	328SPB		ZER

6 PIN EVEREST T145 KEYWAY REQUIRED

HARDWARE GROUP NO. 3

For use on Door #(s):

201 202 203

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	CDSI-PA-AX-98-L-NL-06-SNB	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 36-083 (@ DOGGING)	626	SCH
2	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	THRESHOLD	THRESHOLD AS DETAILED		

6 PIN EVEREST T145 KEYWAY REQUIRED

Maintenance Materials, Provide the following:

- As-built hardware schedule
- Copies of warranty information for each hardware type
- Binder of catalog cuts or complete catalog sections of items used, installation and maintenance/adjustment information.
- Collection of tools that were included with the hardware: wrenches, drivers, etc.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide miscellaneous glass and glazing not provided elsewhere including accessories as required for complete installation.

a. Provide glazing for metal doors and frames.

B. Related Sections:
1. Section 08 51 10: Aluminum window glazing.

1.2 REFERENCES

A. Glass Association of North America (GANA): Glazing Manual and Sealant Manual.

1.3 SUBMITTALS

A. Product Data: Furnish for each type of glass and exposed glazing material.

B. Samples: Furnish samples of exposed glazing accessories.

1.4 WARRANTY

A. Extended Correction Period: Extend correction period to two years for following.

1. Replacing laminated glass which exhibits signs of delaminating.

2. Replacing insulated glass which exhibits signs of moisture on sealed glass surfaces.

3. Replacing mirrors which exhibit signs of desilvering or signs of distortion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Section includes miscellaneous glass and glazing materials for items typically furnished without glazing and where glazing is not an integral part of the assembly.

B. Regulatory Requirements:

1. Safety Glass Standard: Comply with applicable codes, CPSC 16 CFR 1201, and pass ANSI Z97.1.

2. Fire Rated Glass: Provide glass identical to glass tested per ASTM E163, labeled and listed by UL or other testing and inspection agency acceptable to applicable authorities.

C. Tempered Glass: Select glazing quality, clear float glass, fully tempered, ASTM C1048, Kind FT; nominal thickness 1/4"; safety glass.

1. Manufacturers:

a. Vitro Architectural Glass (formerly PPG).
b. Oldcastle Glazing.
c. Guardian Industries Corp.
d. Substitutions: Refer to Section 01 25 00.

2. Locations: Provide at doors and at window openings where required by applicable codes and federal requirements.

D. Insulated Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with minus 20-degree F dew point.

1. Manufacturers:

a. Vitro Architectural Glass (formerly PPG).
b. Oldcastle Glazing.
c. Guardian Industries Corp.
d. Viracon.
e. Substitutions: Refer to Section 01 25 00.

2. Performance: Certified to ASTM E2190 by Insulating Glass Certification Council.

3. System: Manufacturer's standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.

4. Glass: ASTM C1036, select glazing quality clear float glass; nominal 1/4” thick glass.

5. Safety Glass: ASTM C1048, Kind FT, fully tempered select glazing quality clear float glass; nominal 1/4” thick glass; provide at doors and impact areas where safety glass is required by applicable codes and regulations.

6. Total Unit Thickness: 1".

7. Locations: Provide at exterior windows and doors unless otherwise indicated.

E. Spacer Shims: Silicone compatible, 50 durometer hardness; 3" long by 3/32" thick by 1/4" high.

F. Setting Blocks: 70-90 durometer hardness; 4” long by 3/8” thick by 1/4” high standard setting blocks.

G. Glazing Sealant: ASTM C920, Type S, Grade NS, elastomeric one-component silicone glazing sealants as recommended by sealant manufacturer for application involved.

1. Manufacturers:

a. Dow Corning Corp.
b. General Electric Co.
c. Pecora Corp.
d. Substitutions: Refer to Section 01 25 00.

2. Structural and Butt Glazing: Provide high-modulus structural silicone glazing materials recommended by sealant manufacturer for applications where sealant bonds glass to metal system and where sealant bonds glass to glass.

3. Color: As selected by Architect from manufacturer's full range of available colors.

H. Glazing Putty: Linseed oil putty, ASTM C570, Type II; oil and resin base caulking compound for building construction; knife grade.1.

1. Manufacturers:

a. DAP, Inc.
b. Substitutions: Refer to Section 01 25 00.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean glazing channels and framing members to receive glass immediately before glazing; remove coatings not firmly bonded to substrate.

B. Apply primer to joint surfaces where recommended by sealant manufacturer.

3.2 INSTALLATION

A. Comply with GANA Glazing Manual and Sealant Manual and glazing manufacturer recommendations and installation instructions.

1. Do not allow glass to touch metal surfaces.

2. Comply with applicable code requirements and NFPA 80 for glass in fire rated openings.

B. Place setting blocks at quarter points in thin course of sealant.

C. Install removable stops with glass centered in space with spacer shims at 2'-0" intervals on both sides of glass, 1/4" below sightline.

D. Sealant Glazing: Fill gap between glass and stops with sealant to depth equal to bite of frame on glass but not more than 3/8" below sightline.

1. Apply sealant to uniform and level line, flush with sightline; tool or wipe sealant surface for smooth appearance; at exterior locations tool sealant so water is carried away from glass.

3.3 CLEANING

A. At areas subject to potential impact mark glass after installation by crossed streamers attached to framing and held away from glass; do not apply markers to surface of glass.

B. Remove nonpermanent labels immediately after sealant cures; cure sealants for high early strength and durability.

C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during construction period, including natural causes, accidents and vandalism.

END OF SECTION

SECTION 09 01 20

PLASTER PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Patch exterior Portland cement plaster to match existing at locations where conduit, etc. is installed to create new pathways into the existing building electrical room.

2. Patch existing lath where deteriorated and where damaged during construction operations.

1.2 REFERENCES

A. ASTM C841: Installation of Interior Lathing and Furring.

B. ASTM C842: Application of Interior Gypsum Plaster.

C. ASTM C926: Application of Portland Cement Based Plaster.

D. ASTM C1063: Installation of Lathing and Furring For Portland Cement Plaster.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this Section. Require attendance of those directly affecting work of this Section.

1. Review installation procedures and coordination required with related work.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications for each lathing material and accessory.

B. Mock-Up: Provide mock-up of each type of plaster patching.

1.5 PROJECT CONDITIONS

A. Take precautionary measures to ensure excessive temperature changes do not occur.

B. Cold-Weather Requirements: Do not apply plaster unless minimum ambient temperature of 50 degrees F has been and continues to be maintained for minimum 48 hours prior to application and until plaster is cured.

C. Hot-Weather Requirements: Protect plaster from uneven and excessive evaporation during hot, dry weather.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide materials for patching existing plaster systems including lath and accessories which are deteriorated, and which are damaged by construction operations including plaster patching.

B. Regulatory Requirements: Where assemblies are fire rated, provide materials acceptable to applicable authorities for required fire ratings.

1. Provide materials required for systems listed by Underwriters Laboratory, Gypsum Association (GA) File No's in GA-600 Fire Resistance Design Manual, or other listing approved by applicable authorities.

C. Portland Cement Plaster: Provide either neat or ready-mixed (where applicable) materials, at Contractor's option, complying with ASTM C926.

1. Basecoat Materials:

a. Cement: Normal Type 1 or 1A Portland cement, ASTM C150.
b. Lime: Special finishing hydrated lime, Type S, ASTM C206.
c. Aggregate: Natural sand, conforming to ASTM C897 or C144.

2. Brown Coat Water Acrylic Admix: Acrylic latex admix specifically manufactured for use in Portland Cement Plaster applications and which will not detrimentally effect finish.

a. Manufacturers:

1) Larsen Products Corp./Acrylic Admix 101.
2) Thoro System Products, Inc./Acryl 60.
3) Chem-Masters Corp./Cretelox.
4) Substitutions: Refer to Section 01 25 00.

3. Finishing Materials: Same as basecoat with acrylic admix. Factory premix finish coat is acceptable.

a. Provide white cement from a single manufacturer and clear silica sand at applications indicated to have integral color.

4. Portland Cement Plaster Bonding Agents: ASTM C932 bonding agent as recommended by manufacturer for Portland cement exterior applications.

a. Manufacturers:

1) Larsen Product Corp./Weld-Crete.
2) Thoro System Products, Inc./Thorobond.
3) Chem-Masters Corp./Polyweld.
4) Substitutions: Refer to Section 01 25 00.

D. Integral Color: Pure, non-fading, mineral oxide color conforming to ASTM C979 and designed and mixed to provide uniform color finish coat.

1. Color: As selected by Architect and as required to produce final color of plaster to match existing plaster; custom color may be required.

E. Lathing Materials and Accessories: Comply with requirements of referenced ASTM standards and applicable code requirements.

1. Manufacturers:

   a. ClarkDietrich Building Systems.
   b. Phillips Manufacturing Co.
   c. Alabama Metal Industries Corp. (AMICO).
   d. Keene Products from Metalex, a Division of The Koller Group.
   e. Delta Star, Inc., Superior Metal Trim.
   f. Substitutions: Refer to Section 01 25 00.

2. Metal Components:

   a. Exterior Concealed Components: Hot-dipped galvanized, ASTM A653 minimum G90 for 18 gage and lighter formed metal products, ASTM A123 galvanized after fabrication for 16 gage and heavier products.

   b. Exterior Exposed Components: Zinc accessories unless fully concealed in plaster.

   c. Interior Components: Rust-inhibitive paint may be used in lieu of galvanizing other than in areas of potential high humidity.

3. Metal Lath: Self-furring type where over solid substrate.

   a. Typical: Expanded diamond mesh, minimum 2.5 lbs. per square yard.

   b. Soffits: Expanded diamond mesh, minimum 3.4 lbs per square yard; provide ribbed lath where spanning between supports.

   c. Tie Wire: ASTM A641, soft temper, Class 1 zinc coated; minimum 16 gage for tying metal lath to furring channels and metal lath to metal lath.

4. Inside Corner Mesh: Minimum 26 gage steel; perforated or expanded flanges or clips shaped to permit complete embedding in plaster; minimum 3" x 3" size.

5. Anchorages: Tie wire, nails, screws and other approved metal supports, of type and size to suit application.

6. Accessories: Provide as required for complete plaster patching, replace components which are damaged; match existing; conform to recommendations of referenced standards.

   a. Casing Beads and Base Screeds: Minimum 26 gage, square edges at casing beads; provide with expanded flanges.

   b. Expansion and Control Joints: Match existing.

2.2 PLASTER MIXES

A. Provide Portland cement plaster mixes in accordance with ASTM C926 as appropriate to substrate indicated and approved samples.

B. Provide gypsum plaster in accordance with ASTM C842 as appropriate for patching existing interior plaster.

C. Mix only as much plaster as can be used in one hour.

D. Mix materials dry, to uniform color and consistency, before adding water.

E. Protect mixes from frost, dust and evaporation.

F. Do not retemper mixes after initial set has occurred.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify climatic and surface conditions are satisfactory.

B. Do not commence installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Preparation of Existing Plaster: Remove deteriorated plaster, cut back to sound plaster and back bevel remaining plaster edges, route cracks to scratch coat and bevel plaster edges.

1. Apply bonding agent to existing plaster in accordance with bonding agent manufacturer's recommendations.

2. Remove and replace lathing which is rusted or damaged; remove sufficient plaster to allow firm wire tie bond of new lathing to existing undamaged lathing.

a. Metal Lath: Apply metal lath taut, with long dimension perpendicular to supports; secure end laps with tie wire where they occur between supports; lap sides minimum 1-1/2"; secure with tie wires.

3. Where efflorescence or stains are evident, ensure cause of moisture in back-up materials has been eliminated.

B. Installation of New Metal Accessories: Fasten in place true to line and in correct relation to adjacent materials and as to prevent dislodging and misalignment by subsequent operations. Fasten at both ends and at maximum 12" on center.

1. Bring grounding edge of accessories to true lines, plumb, level, and straight.

2. Install accessories to provide required depth of plaster and to bring plaster surface to required plane.

3. Install continuous corner reinforcement for full length of external corners.

4. Beads: Use single length of metal beads wherever length of run does not exceed longest standard stock length available; miter or cope corners.

    a. Provide casing beads where plaster abuts dissimilar construction and at perimeter of openings where edges of plaster will not be concealed by other work.

3.3 PATCHING PORTLAND CEMENT PLASTER

A. Remove surface deposits on plaster with dry brush and wipe affected areas with damp cloth.

B. General: At major repair areas conform to ASTM C926.

1. Apply cement plaster using three coats unless otherwise required to match existing.

2. Apply each base coat to minimum thickness of 3/8"; allow each coat to slowly dry for minimum period of 48 hours;

    a. Moist cure first base coat (scratch coat) during 48 hour period.

3. Allow base coats to cure for minimum 7 days prior to application of finish coat.

4. Evenly dampen base coat, to ensure uniform suction, and apply finish coat; apply thickness sufficient to secure required texture but in no case less than 1/8".

    a. Apply pre-mixed finish coat in accordance with manufacturer's recommendations.

5. Maintain surface flatness, with maximum variation of 1/8" in 10'-0".

6. Avoid excessive working of surface, delay trowelling as long as possible to avoid drawing excess fines to surface.

7. Finish: Provide surfaces with finish to match existing.

C. Repairing Portland Cement Plaster: Repair major and minor damage to cement plaster (stucco).

1. For sound cement plaster, having small cracks or other cosmetic blemishes, clean entire surface of existing plaster with detergent, and rinse with clear water.

    a. If surface has been painted, remove paint.

    b. Over one or two coats of sound condition paint, after washing and rinsing surface apply one coat of bonding agent tested and compatible with paint.

    c. Apply finish coat of Portland cement stucco to thickness of approximately 1/8", and texture as required to match adjacent plaster finish.

    d. Take special precautions to ensure temperature of material is maintained at 50 degrees F. during, and for not less than, 48 hours after application.

2. For unsound cement plaster, where segments have become detached from back-up base, remove unsound areas, and verify condition of back-up or base.

    a. Replace damaged lath or lath without sufficient mechanical bond with new self-furring galvanized metal lath.

    b. If back-up is concrete or masonry, clean it completely of old cement plaster and apply one coat of bonding agent.

    c. Apply scratch coat to back-up or base; scratch horizontally for proper bond with brown coat; cure for minimum 48 hours.

    d. Apply brown and finish coats as required for general Portland cement plaster.

    e. Texture finish coat as required to match existing.

3. For large cracks in cement plaster, undercut edges on both sides of cracks to back-up material or base; dry brush cracks clean.

    a. Apply coat of bonding agent to surfaces of damaged area; mix and apply scratch, brown and finish coats as specified.

3.4 CLEANING

A. Promptly remove plaster from surfaces not indicated to be plastered.

B. Repair other surfaces damaged by plaster patching operations to original undamaged condition as approved by Architect.

3.5 PROTECTION

A. Protect surfaces from stains, marring, and other damage; repair stained, marred and damaged surfaces prior to Substantial Completion.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide painting and finishing of exposed items and surfaces requiring field painting and finishing including shop primed items.

1. Specified surface preparation, priming and coats of paint are in addition to shop-priming and surface treatment specified under other sections of work.

2. Painting and finishing include field finishing of exterior and interior items not listed as "Surfaces not to be Painted" unless clearly indicated otherwise.

3. Painting and finishing include field finishing of select shop finished items such as mechanical grilles and registers and shop primed items such as access panels and louvers in doors, to match adjacent surfaces.

    a. Match adjacent surfaces in color and sheen unless otherwise indicated.

4. Field paint exposed bare and covered pipes, ducts, and hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work in occupied spaces.

5. Paint added conduit and repaired surfaces at existing main building.

B. Surfaces Not to be Painted:

1. Finished items including finished metal surfaces.
2. Walls and ceilings in concealed areas and generally inaccessible areas.
3. Moving parts of operating mechanical and electrical units.
4. Labels: Keep equipment identification and fire rating labels free of paint.
5. Plastic smoke stops and weather-stripping at doors.

C. Related Sections: Shop priming of ferrous metal items is included under various Specification sections.

1. Section 06 40 00: Shop finishing of architectural woodwork.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's technical information, including paint label analysis and application instructions for each material.

B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.

1. Brush-Outs: Submit samples of each color and material with texture to simulate actual conditions, on hardboard.

2. Field Samples: Duplicate painted finishes of approved samples on actual wall surfaces and components for approval prior to commencing work.

    a. Size: Minimum 100 sf located where approved.
    b. Components: One full component as directed.
    c. Simulate finished lighting conditions for review.

C. Manufacturer Certificates: Furnish certificates from each manufacturer stating materials are top quality lines and suitable for intended use on this Project.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with *CAL*Green requirements including those relative to finish material pollution control for paints and coatings.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, with:

1. Name of material, color and sheen.
2. Manufacturer's name, stock number and date of manufacture.
3. Contents by volume, for major pigment and vehicle constituents.
4. Thinning and application instructions.

1.5 SITE CONDITIONS

A. Apply water-base paints when temperature of surfaces and surrounding air are between 50 and 90-degrees F.

B. Do not apply paint in rain, fog or mist; or when relative humidity exceeds 85 percent; or to damp or wet surfaces.

C. Painting may be continued during inclement weather if areas to be painted are enclosed and heated within temperature limits specified.

D. Provide additional temporary ventilation during interior application of paints to eliminate volatile organic compound (VOC) emissions from interior spaces as quickly as possible.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Sherwin-Williams Co.

B. Dunn-Edwards Corp.

C. Vista Paint Co.

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide painting and finishing of exposed items and surfaces requiring field painting and finishing including shop primed items.

1. Definition: "Painting" and “coating” as used herein means systems including primers, emulsions, enamels, stains, sealers and fillers, whether used as prime, intermediate or finish coats.

B. Regulatory Requirements:

1. Volatile Organic Compound (VOC) Emissions: Furnish materials approved for use by applicable air quality management district for limitations of volatile organic compounds for architectural or special coatings as applicable.

CALIFORNIA REQUIREMENT BELOW, REVISE IF OTHER METHOD USED AT EXIT STAIRS.

2. California Stair Stripes: Paint 2" stripes at stair nosing not otherwise marked, full tread and landing width, in accordance with California Code of Regulations, Title 24, Access Compliance requirements.

a. Exterior Stairs: Provide at landing and each tread in each stair run.
b. Interior Stairs: Provide at landing and last tread at each stair run.

C. Material Quality: Provide top line quality commercial grade (professional painter) paints; materials not bearing manufacturer's identification as their top line product shall not be acceptable.

1. Primers: Provide premium grade primers recommended by paint manufacturer for substrates indicated and for finish systems specified.

2. Undercoats and Barrier Coats: Provide undercoat paints produced by same manufacturer as finish coats; use only thinners approved by paint manufacturer and use only within recommended limits.

3. Finish Coats: Provide finish coats capable of being washed with mild detergent without loss of color, sheen, or pigments.

a. Color pigments: Pure, non-fading, applicable types to suit substrates and service indicated; no lead content permitted.

4. Finish Coat Coordination: Provide finish coats which are compatible with prime paints, undercoats, and barrier coats used.

a. Review other Specification sections in which prime paints are provided; ensure compatibility of total coatings systems.

b. Upon request from other trades furnish information on characteristics of finish materials proposed for use.

c. Provide barrier coats over incompatible primers or remove and prime as required.

d. Notify Architect in writing of any anticipated problems in use of specified coating systems with substrates primed by others.

D. Colors and Finishes: Prior to commencement of painting work, Architect will furnish color chips for surfaces to be painted.

1. Use of proprietary names in color selection is not intended to imply exclusion of equivalent products of other manufacturers.

2. Final acceptance of colors will be from samples applied on site.

3. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection: Examine areas and conditions under which painting work is to be applied.

1. Start of painting work indicates acceptance of surfaces and conditions of surfaces and conditions within any area.

2. Where exposed items or surfaces are not specifically mentioned in Schedules, paint same as adjacent similar materials or areas.

3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable paint film.

B. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified for substrate condition.

1. Existing Painted Finishes:

a. Clean existing painted surfaces and remove oil, grease, dust, stains, scale, efflorescence, mildew, mold, algae, blisters, and non-adhering paint.

b. Measure adhesion of existing paints using ASTM D3359 tape test; remove existing coatings where poor adhesion is indicated.

c. Feather edges of severely deteriorated paint where several coats are removed as part of cleaning, to provide smooth transition for new paint.

d. Fill holes, cracks, and defects and fill and sand smooth, ready for new paint finish.

C. Remove hardware, accessories, and items in place and not to be painted, or provide protection prior to surface preparation and painting; after painting reinstall removed items.

D. Clean surfaces before applying paint; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly painted surfaces.

E. Cementitious Materials: Prepare by removing efflorescence, chalk, dirt, grease, oils, and by roughening as required to remove glaze.

1. Determine alkalinity and moisture content of surfaces to be painted.

2. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, neutralize before application of paint.

3. Do not paint over surfaces where moisture content exceeds manufacturer's printed directions.

F. Ferrous Metals: Touch up shop-applied prime coats wherever damaged using same type of primer as applied in shop or barrier coat compatible with finish paint.

1. Bare Surfaces: Clean surfaces that are not galvanized or shop-coated, of oil, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

2. Galvanized Surfaces: Clean free of oil and surface contaminants, using non-petroleum-based solvent; primer and touch-up primer to be zinc-rich primer.

G. Mix painting materials in accordance with manufacturer's directions.

H. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

I. Stir materials before application to produce mixture of uniform density and stir as required during application; do not stir surface film into material, if necessary, strain material before using.

3.2 APPLICATION

A. Apply paint in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and type of material being applied.

1. Apply additional coats when stains or blemishes show through final coat, until paint is a uniform finish, color and appearance.

2. Provide extra attention during application to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.

3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces; paint surfaces behind permanently fixed equipment and furniture with prime coat only.

4. Finish doors on tops, bottoms and side edges same as faces.

5. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

6. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

7. Sand lightly between coats when recommended by system manufacturer.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or prepared for painting as soon as practicable after preparation.

1. Allow time between successive coatings to permit proper drying.

2. Do not recoat until paint feels firm and does not deform or feel sticky under moderate thumb pressure.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.

D. Prime Coats: Apply to items not previously primed; recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.

E. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections.

1. Opaque Finishes: Provide opaque, uniform finish, color and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness, and other surface imperfections are not acceptable.

F. Completed Work: Match approved samples for color, texture and coverage; remove, refinish or repaint work not accepted.

3.3 PAINTING SCHEDULE

A. Exterior Work: Provide following paint systems and sheens unless otherwise indicated.

1. Metal: Semigloss sheen.

a. 1st Coat: Touch-up primer, prime if none.
b. 2nd and 3rd Coat: Exterior 100% acrylic enamel.

2. Metal: High-performance coating specified in Section 09 96 70.

3. Concrete: Flat sheen.

a. 1st and 2nd Coat: Exterior acrylic latex emulsion.

4. Concrete, Elastomeric Coating:

a. Refer to Section 09 96 80 – Elastomeric Coating.

5. Plaster: Flat sheen.

a. 1st and 2nd Coat: Heavy body vapor permeable waterproof elastomeric acrylic coating.

6. Plaster: Flat sheen.

a. Refer to Section 09 96 80 – Elastomeric Coating.

7. Traffic Line Paint: Manufacturer's standard sheen; colors as required by line or symbol; blue for handicapped parking spaces.

    a. 1st and 2nd Coat: Water based acrylic/epoxy traffic line paint; other systems subject to prior approval by Architect.

A. Interior Work: Provide following paint systems and sheens unless otherwise indicated.

1. Gypsum Board Systems: Eggshell (satin) sheen at walls, flat sheen at ceilings, semigloss sheen at toilet rooms.

    a. 1st Coat: Universal primer.
    b. 2nd and 3rd Coat: Interior latex or acrylic latex emulsion.

2. Metal: Semigloss sheen.

    a. 1st Coat: Touch-up primer, prime if none.
    b. 2nd and 3rd Coat: 100% acrylic enamel.

3. Concrete: Flat sheen.

    a. 1st Coat: Primer sealer.
    b. 2nd and 3rd Coat: Interior latex emulsion.

4. Concrete Masonry Units: Flat sheen.

    a. 1st Coat: Surface filler.
    b. 2nd and 3rd Coat: Interior latex emulsion.
    c. Apply filler at rate to ensure coverage with pores filled.

5. Plaster: Eggshell (satin) sheen at walls, flat sheen at ceilings, semigloss sheen at toilet rooms.

    a. 1st Coat: Latex primer-sealer.
    b. 2nd and 3rd Coat: Interior acrylic latex emulsion.

6. Concrete Floors: Gloss sheen; non-slip finish.

    a. 1st Coat: Concrete conditioner.
    b. 2nd and 3rd Coat: Polyurethane coating.

B. Sheens: Comply with ASTM D523, reflectance of paint.

1. Flat: 1-10.
2. Satin: 15-30.
3. Eggshell: 30-45.
4. Semigloss: 45-75.
5. Gloss: 75-100.

3.2 CLEAN-UP, PROTECTION, AND REPAIR

A. Clean-Up: During progress of work, remove discarded paint materials, rubbish, cans and rags from site at end of each workday.

1. Clean glass and paint-spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

B. Protection: Protect work of other trades, whether to be painted or not; correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs to protect newly painted finishes.

2. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces or defaced painted surfaces.

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide general signage as indicated complete with attachment devices and accessories as required for complete installation.

B. Related Sections:

1. Section 09 90 00: Traffic line paint.
2. Section 10 44 00: Fire extinguisher cabinet graphics.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer's literature and indicate each sign type, style, color, and method of attachment.

B. Shop Drawings: Furnish listing of sign types, lettering and locations, along with dimensions of each sign.

1. Computerized Output: Furnish computerized samples of signs and graphics at full scale duplicating final appearance.

C. Samples: Furnish full size samples where requested.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with *CAL*Green requirements including those relative to finish material pollution control for adhesives.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Package separately or in like groups of names, labeled as to names enclosed; include installation template, attachment system and installation instructions.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. ASI Modulex, ASI Sign Systems, Inc.

B. Mohawk Sign Systems.

C. Vomar Products, Inc.

D. Brandex: www.brandexmedia.com

E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide signage as indicated with attachment devices and accessories.

B. Regulatory Requirements: Provide signs for assuring access for persons with disabilities in accordance with state and federal regulations.

1. California Regulations: Comply with California Building Code.

2. Federal Regulations: Comply with Americans with Disabilities Act (ADA) Standards.

C. Entry Decals: Provide minimum 6" square decals with international handicapped symbol white on blue background with white border, applied to glass at accessible entry doors of existing buildings where all entry doors are not accessible.

D. Tactile Exit Door Signs: Provide colored plastic/photopolymer signs, conforming to California Building Code Section 1011.3 and ADA Standards for signs for permanent rooms, with tactile raised and Braille characters; concealed mounting system.

1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

2. Size and Style: As indicated on Drawings.

E. Room Identification and Direction Signs: Provide signs conforming to California and ADA Standards for permanent signs, total thickness 0.125"; provide raised and Braille characters conforming to California and ADA Standards; concealed mounting.

1. Material, Plastic: Manufacturer’s standard colored plastic/photopolymer signs.

a. Texture: Smooth.

2. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

3. Sizes and Styles: As indicated on Drawings, as directed by Architect where not otherwise indicated.

F. Applied Copy Signs and Graphics: Letters and graphics as indicated on Drawings; Contractor option of silk-screen or vinyl applied.

1. Silk-screen Signs and Graphics: Computer design screens for signs and graphics to designs and criteria established by Architect.

a. Silk-screen Lacquer: Match Advanced Screen Products/Industrial Gloss Lacquer Silk-screen Ink; colors as selected by Architect.

2. Vinyl Signs and Graphics: Computer design vinyl signs and graphics to designs and criteria established by Architect.

a. Vinyl: Opaque non-reflective vinyl film, minimum 0.0035" thick, with pressure sensitive adhesive backing suitable for applications indicated; match 3M/Scotchcal Vinyl Film.

3. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

G. Tactile Emergency Evacuation Signs: Silk-screened polycarbonate with screening on back and with tactile and Braille information conforming to California requirements and ADA Standards.

1. Information: Provide sign system with information as required by applicable authorities for emergency egress.

2. Silk-Screen Colors:

a. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

b. Silk-screen Lacquer: Match Advanced Screen Products/Industrial Gloss Lacquer Silk-screen Ink; colors as selected by Architect.

3. Size and Style: As indicated on Drawings and acceptable to applicable authorities.

4. Attachment: Method subject to Architect approval.

5. Photoluminescent exit signs are in Division 26.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs in accordance with manufacturer recommendations and installation instructions, free from distortions and defects.

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B. Tactile Exit Door Signs: Install at doors with lighted “EXIT” signs; apply after walls are finished.

1. Location: Mount signs at 48" to 60" height as required by applicable codes on strike side of door.

2. Install level, in line, in accordance with the manufacturer's recommendations and ADA Standards to allow a person to approach within 3" of signs without being within a door swing and without encountering protruding objects.

3. Clean and polish, remove excess adhesive.

C. Room Identification and Direction Signs: Install signs after walls are finished.

1. Location: Mount signs at 48" to 60" height as required by applicable codes on strike side of door for room identification signs, where indicated for direction signs.

2. Room Identification Signs Location: Mount signs with tactile characters 48" minimum (baseline of lowest Braille cells) and 60" maximum (baseline of highest line of raised characters) above finished floor and with on strike side of door for room identification signs and where indicated for directional signs.

3. Install signs level, in line, in accordance with the manufacturer's recommendations, California Building Code and ADA Standards.

4. Install room identification signs at doors to allow a person to approach within 3" of signs without being within a door swing and without encountering protruding objects.

5. Clean and polish, remove excess adhesive.

D. Applied Copy Signs and Graphics: Examine surfaces and construction for conditions adversely affecting installation, performance and quality of work.

1. Apply signage and graphics centered and level, in line, in accordance with manufacturer's recommendations.

E. Emergency Evacuation Signs: Install signs after walls are finished.

1. Location: Mount signs at locations indicated, as directed by Architect and applicable authorities if not otherwise indicated.

2. Install signs level and in accordance with the manufacturer's recommendations and requirements of applicable authorities.

3. Clean and polish.

END OF SECTION

SECTION 10 44 00

FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide fire extinguisher cabinets with accessories as required for complete installation.

1. Surface Mounted: Provide surface mounted fire extinguisher cabinets with exposed frame (trim) for garage and areas not in a path of travel.

2. Fire Extinguishers: Owner furnished and installed.

B. Related Sections:

1. Division 21: Fire protection systems.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer's literature.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. J.L. Industries.

B. Larsen’s Manufacturing Co.

C. Potter Roemer.

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. Systems Description: Provide fire extinguisher cabinets with accessories.
1. Studio: Surface mounted exposed frame fire extinguisher cabinets.
a. perrmitting door to open 180 degrees.

B. Surface Mounted Fire Extinguisher Cabinets:

1. Types:

a. J.L. Industries/Ambassador Series.
b. Larsen’s Mfg. Co./Architectural Series.
c. Potter Roemer/Alta Series.
d. Substitutions: Refer to Section 01 62 00.

2. Cabinet Depth (Typical): Provide cabinets designed for space available in walls with fire extinguisher cabinets, and of depth to house 2A-10BC multi-purpose dry chemical type fire extinguisher.

3. Hazardous Areas (Garage): Provide cabinets designed to house 4A-60BC multi-purpose dry chemical type fire extinguisher at locations indicated on Drawings or designated as hazardous.

4. Type: Fully exposed, mounted directly to wall, with manufacturer’s standard rolled edge trim based on specified cabinets.

5. Metal Gages: Provide cabinets fabricated of minimum 18-gage throughout, 20-gage permitted for back.

6. Construction: One-piece tubular door frames mitered and welded; weld joints and grind smooth; manufacturer's standard steel box with white baked enamel interior finish and primed exterior finish.

    a. Steel Doors and Trim: Manufacturer's standard, prime coat finished.
    b. Doors: Break-glass or similar secured access panel, with inside latch and lock.
    c. Door Hardware: Continuous type hinge permitting door to open 180 degrees.

B. Fire Rated Wall Construction (Trimless and Semi-Recessed): Provide fire extinguisher cabinet manufacturer's materials as required to maintain integrity of fire rated partitions where cabinets are inset in fire rated partitions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which fire extinguisher cabinets are to be installed.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install cabinets in locations and at mounting height to comply with requirements of governing authorities; prepare recesses in walls as required.

B. Securely fasten to structure, square and plumb, in accordance with manufacturer's instructions.

1. Wherever exact location of units is not shown, locate as directed by Architect.

3.3 IDENTIFICATION

A. After installation and finishing is completed, silkscreen or apply decal letters spelling "FIRE EXTINGUISHER" as applicable.

B. Letter size, style and location as selected by Architect.

END OF SECTION

SECTION 21 13 00

FIRE SUPPRESSION SPRINKLER SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

A. AMERICAN IRON AND STEEL INSTITUTE (AISI)

1. AISC/AISI 121 (2007) Standard Definitions for Use in the Design of Steel Structures

B. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

1. ASME A112.18.1 (2018) Plumbing Supply Fittings

2. ASME B1.20.1 (2013) Pipe Threads, General Purpose (Inch)

3. ASME/ANSI B16.1 (2020) Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250

4. ASME/ANSI B16.3 (2016) Malleable Iron Threaded Fittings, Classes 150 and 300

5. ASME/ANSI B16.4 (2016) Standard for Gray Iron Threaded Fittings; Classes 125 and 250

C. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. AWWA C111/A21.11 (2017) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

2. AWWA C151/A21.51 (2017) Ductile-Iron Pipe, Centrifugally Cast

3. AWWA C900 (2016) Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4-inch Through 60-inch

D. ASTM INTERNATIONAL (ASTM)

1. ASTM A47/A47M (1999) Standard Specification for Ferritic Malleable Iron Castings

2. ASTM A53/A53M (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

3. ASTM A135/A135M (2009; R2014) Standard Specification for Electric-Resistance-Welded Steel Pipe

4. ASTM A234/A234M (2019) Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

5. ASTM A536 (1984) Standard Specification for Ductile Iron Castings

6. ASTM D1784 (2020) Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

E. FM GLOBAL (FM)

1. FM APP GUIDE (updated on-line) Approval Guide http://www.approvalguide.com/

F. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1. NFPA 13 (2016) Standard for the Installation of Sprinkler Systems

2. NFPA 24 (2016) Standard for the Installation of Private Fire Service Mains and Their Appurtenances

3. NFPA 1963 (2019) Standard for Fire Hose Connections

G. UNDERWRITERS LABORATORIES (UL)

1.2 ADMINISTRATIVE REQUIREMENTS

A. Conduct a survey of the work area. Commencement of work constitutes acceptance of existing conditions.

B. Convene one week before starting work of this section for preinstallation meeting.

1.3 SUBMITTALS

A. Submit the following in accordance with DIVISION 01 – GENERAL REQUIREMENTS.

1. Shop Drawings

a. Shop drawings prepared in accordance with NFPA 13, including hydraulic calculations that are approved by the Authority Having Jurisdiction. Drawings shall have the approval of a NICET Level III (or higher) registered in the state in which the project is located. Drawings to consist of the following, refer to NFPA 13 “Plans and Calculations” for a comprehensive list of items to be included:

1) Piping plan view and/or Reflected Ceiling Plan (RCP) drawing(s) indicating relationship of all other trades and approved sprinkler head locations.

2) Details and sections to clearly identify design intent.

3) Plans shall include: Seismic zones of influence, hydraulic remote areas, elevations of pipe, attachment locations and type, zones and associated

coverage areas, volume of dry system(s) (if applicable), locations of seismic separation and expansion joints, hose cabinet locations, drain locations.

2. Product Data

    a. Provide data on piping, valves, sprinklers, hangers/supports, hose cabinets, notification devices, specialties and accessories. Product data shall include manufacturers catalog information with performance ratings, rough-in details, finish, weights, and installation requirements.

        1) Each product shall be referred to on submittals, drawings, and other documentation, by the identification or model number as specifically published in the appropriate agency listing or approval.

3. Design Data

    a. Provide detailed hydraulic calculations that clearly demonstrate that the water supply will meet the demand of the sprinkler system and hose streams. Calculations shall accompany design drawings and shall be based on a water flow test conducted at the site within six (6) months of the submittal of plans for approval. Flow test information and associated nodes shall be documented on shop drawings and include a site plan.

    b. Provide complete seismic calculations that clearly reflect seismic restraint with supporting site specific force factor and attachment details used, relative to an associated zone of influence.

4. Test Reports

    a. Contractor's Material & Test Certificate Reports in accordance with NFPA for above ground piping, underground piping, pressure, system operation, air, valve and drain tests.

1.4 QUALITY ASSURANCE

A. Fire protection system materials and components shall be Underwriter's Laboratories listed and labeled, or Factory Mutual approved.

B. Company specializing in performing the work of this section shall have a minimum of five years experience and approved by manufacturer.

C. Manufacturing Company shall be one specializing in manufacturing the products specified with a minimum three years documented experience.

1.5 COORDINATION

A. The Contractor shall coordinate and reflect routing and location of equipment, devices, and materials with other disciplines, where not already indicated, on the

design documents. Indicate required space for routine maintenance and inspection, including location and sizes of access doors.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

A. All fire protection system materials and equipment shall be Underwriters Laboratories (UL) listed or the Factory Mutual (FM) approved for its intended use.

2.2 EQUIPMENT

A. Aboveground Piping Materials

1. BCS - Black Carbon Steel

a. All piping 2-inch and smaller: Schedule 40, black-carbon steel conforming to ASTM A53, or ASTM A135, threaded or roll grooved ends. All 1-inch pipe shall have threaded ends.

b. All Piping 2-1/2-inch through 8 inch: Schedule 10, black carbon steel conforming to ASTM A53 or ASTM A135, roll grooved ends.

2. GCS - Galvanized Carbon Steel

a. All piping 1/2- inch through 8-inch: Schedule 40 seamless or electric resistant welded galvanized steel conforming to ASTM A53/A53M, Type E (electric-resistance welded) or Type S (seamless). Type F (furnace butt welded continuous welded) is acceptable for sizes less than 2 inches.

B. Fittings and Couplings

1. Cast-Iron Threaded Fittings:

a. ASME/ANSI B16.4, Class 125, standard pattern, for threaded joints. Threads shall conform to ANSI B1.20.1.

2. Malleable-Iron Threaded Fittings:

a. ASME/ANSI B16.3, Class 150, standard pattern, for threaded joints. Threads shall conform to ANSI B1.2.1.

3. Steel Fittings:

a. ASTM A234/A234M, seamless or welded, for welded joints.

4. Grooved Mechanical Fittings:

a. ASTM A536, Grade 65-45-12 ductile iron; ASTM A47 Grade 32510 malleable iron; or ASTM A53, Type F or Types E or S, Grade B fabricated steel fittings with grooves or shoulders designed to accept grooved end couplings.

5. Grooved Mechanical Couplings:

a. consist of ductile or malleable iron housing, a synthetic rubber gasket of a central cavity pressure-responsive deign; with nuts, bolts, locking in, locking toggle, or lugs to secure roll-grooved pipe and fittings. Grooved mechanical couplings including gaskets used on dry-pipe systems shall be listed for dry-pipe service.

6. Cast-Iron Flanges:

a. ASME/ANSI B16.1, Class 125, raised ground face, bolt holes spot faced.

7. Unions:

a. Malleable iron, Class 150 hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces, female threaded ends. Threads shall conform to ASME B1.20.1.

8. Dielectric Unions:

a. Threaded, solder, or grooved-end connections as required to suit application' constructed to isolate dissimilar metals, prevent galvanic action, and prevent corrosion.

C. Pipe Hangers and Supports

1. Shall be UL listed and shall meet requirements of NFPA 13 for type, dimension and location.

2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.

3. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.

4. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.

5. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.

6. Vertical Support: Steel riser clamp.

7. Hanger Rods: Use only circular solid cross section rod hangers to connect building structure attachments to pipe-support devices. Use pipe, straps, or bars of equivalent strength for hangers.

D. Alarm Devices

1. General: Types and sizes shall mate and match piping and equipment connections.

2. Water Flow Indicators (Wet-pipe Systems): vane type waterflow detector, rated to 250 psi; designed for horizontal or vertical installation; have 2-SPDT circuit switches to provide isolated alarm and auxiliary contacts, 7 ampere 125 volts AC and 0.25 ampere 24 Volts DC; completed with factory-set, field-adjustable retard element to prevent false signals, and tamperproof cover.

3. Water Flow Indicators (Dry-pipe): pressure type waterflow detector, rated to 250 psi; designed for vertical installation; have 2-SPDT circuit switches to provide isolated alarm and auxiliary contacts, 7 ampere 125 volts AC and 0.25 ampere 24 Volts DC; complete with factory-set, field-adjustable retard element to prevent false signals, and tamperproof cover.

4. Electric Alarm Bell: UL listed 10” electric operated factory painted alarm bell with weatherproof bell kit and bell guard. Bell shall have minimum 90 decibel rating. Provided engraved plate under Bell lettered “Sprinkler System.”

5. Supervisory Switches: SPST, normally closed contacts, designed to signal valve in other than full open position and tamperproof cover.

2.3 Automatic Sprinklers

A. Sprinklers must comply with UL 199 and NFPA 13. Sprinklers with internal O-rings are not acceptable. Sprinklers in high heat areas including attic spaces or in close proximity to unit heaters must have temperature classification in accordance with NFPA 13. Extended coverage sprinklers are permitted for loading docks, residential occupancies and high-piled storage applications only.

1. Sprinkler Finishes: Provide sprinklers and matching escutcheons as indicated in the contract documents or as approved by Owner or Architect. All sprinklers are to be glass bulb type unless otherwise approved by Owner or Architect.

2. Upright Sprinkler

a. Upright sprinkler must be quick response with an architect approved finish and have a nominal K-factor of 5.6.

3. Corrosion-Resistant Sprinkler

a. Corrosion-resistant sprinkler must be the upright type installed in locations as indicated. Corrosion-resistant coatings must be factory-applied by the sprinkler manufacturer.

B. Sprinkler Cabinet and Wrench: Provide spare sprinklers in accordance with NFPA 13 and must be placed in a suitable metal or plastic cabinet of sufficient size to accommodate all the spare sprinklers and wrenches in designated locations. Spare sprinklers must be representative of, and in proportion to, the number of each type and temperature rating of the sprinklers installed as required by NFPA 13. At least one wrench of each type required must be provided.

C. Head Protection

1. Protect heads with paper or plastic bags during painting operations. Remove protection immediately upon finishing painting operations.

2. Provide head guards wherever mechanical damage could occur. Guard finish to be red enamel.

D. Aboveground Valves

1. Ensure gate, globe, and check valves (all sizes) are FM approved or UL listed.

2. Ensure ball valves, 2 inches and under, are FM approved, rated 300 psi, with provisions to wire or lock handle in place where critical alarm function may be isolated.

3. Ensure butterfly valves, 6-inches and larger are FM approved, rated 175 psi, cast-iron bodied wafer type, with elastomer liners and seals.

E. Paints and Coatings

1. Paints and coatings must comply with:

a. The California Department of Public Health (CDPH) Standard Method v1.1-2010 general testing and emissions evaluation requirements.

b. All paints/coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (2007), Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.

F. Adhesives, Sealants, and Sealant Primers

1. Adhesives, sealants, and sealant primers must comply with:

a. The California Department of Public Health (CDPH) Standard Method v1.1-2010 general testing and emissions evaluation requirements.

b. All adhesives, sealants, and sealant primers wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by methods specified in Rule 1168.

PART 3 EXECUTION

3.1 Preparation

A. Painting

1. If manufacturer's standard-finish equipment surfaces are damaged during construction, bring to as-new condition by touchup or repainting to the

satisfaction of the Contracting Officer, or replaced with new undamaged equipment at no additional cost to the Owner.

3.2 Installation

A. Ensure installation of system materials and equipment is in accordance with the recommendations and provisions of NFPA 13. Perform work in the presence of the Contracting Officer.

B. Perform all installation work by licensed fire protection sprinkler contractors, licensed for such work in the state where the work is to be performed.

3.3 Underground Piping Installation

A. The fire protection water main shall be laid, and joints anchored, in accordance with NFPA 24. Minimum depth of cover shall be 3-feet. The supply line shall terminate inside the building with a flanged piece, the bottom of which shall be set not less than 6-inches above the finished floor. A blind flange shall be installed temporarily on top of the flanged piece to prevent the entrance of foreign matter into the supply line.

B. Thrust Blocks

1. Construct 3,000-psi cured-strength thrust blocks to absorb hydraulic thrust at caps, plugs, and at system change-of-direction fittings. Place concrete against undisturbed soil, with an area sufficient to provide load transmittal.

3.4 Aboveground Piping Installation

A. Locations and Arrangements: Coordinate installation of horizontal piping with other components. Allow sufficient space above removable ceiling panels to allow for panel removal.

B. Install system such that all piping is rigidly secured and supported. Cutting of structural members for passage of sprinkler pipes or hangers will not be permitted. Route all sprinkler piping and provide all offsets, bends and elbows around all mechanical, electrical, and structural members as required. In areas with ceilings, piping shall be routed concealed, above ceiling. In areas without ceilings, piping shall extend as high as possible.

C. Deviations from approved “Working Plans” for sprinkler piping require written approval of the Authority Having Jurisdiction. Written approval shall be on file with the Engineer prior to deviating from the approved “Working Plans.”

D. Install sprinkler piping to provide for system drainage in accordance with NFPA 13.

E. Use approved fittings to make all changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

F. Hangers and Supports: Comply with the requirements of NFPA 13. Hanger support spacing and locations for piping joined with grooved mechanical couples shall be in accordance with the grooved mechanical coupling manufacturer’s written instructions,

for rigid systems. Provide protection from damage where subject to earthquake if required by the applicable building code, designed in accordance with NFPA 13.

G. Make connections between underground and aboveground piping using an approved transition piece strapped or fastened to prevent separation.

H. Install mechanical sleeve seal at pipe penetrations in basement and foundation walls.

I. Install test connections sized and located in accordance with NFPA 13 complete with shutoff valve. Test connections may also serve as drain pipes.

J. Install pressure gauge on the riser or feed main at or near each test connection. Provide gauge with a connection not less than ¼ inch and having a soft metal seated globe valve arranged for draining pipe between gauge and valve. Install gauges to permit removal, and where they will not be subject to freezing.

K. Install automatic air vent at high point of system(s) in accordance with NFPA 13.

L. Sleeves

1. Provide sleeves where piping passes through roofs, masonry or concrete walls, or floors.

2. Continuously weld or braze sleeves to the deck when passing through steel decks.

3. Install sleeves that are continuous when extending through floors, roofs, or load-bearing walls, and sleeves through fire barriers. Fabricate sleeves from Schedule 40 steel pipe with welded anchor lugs. Form other sleeves by molded linear polyethylene liners or similar materials that are removable. Ensure diameter of sleeves is large enough to accommodate pipe, insulation, and jacketing without touching the sleeve, and additionally provides a minimum 3/8-inch clearance. Install sleeve to accommodate mechanical and thermal motion of pipe and to preclude transmission of vibration to walls and generation of noise.

4. Pack solid the space between a pipe and the inside of a pipe sleeve or a construction surface penetration or wherever the piping passes through firewalls, equipment-room walls, floors, and ceilings connected to occupied spaces, and other locations where sleeves or construction-surface penetrations occur between occupied spaces. Use a mineral fiber. Where sleeves or construction-surface penetrations occur between conditioned and unconditioned spaces, fill the space between a pipe, bare or insulated, and the inside of a pipe sleeve or construction-surface penetration with an elastomer caulk to a depth of 1/2 inch. Ensure surfaces are oil- and grease-free before caulking.

5. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.

M. Escutcheons

1. Install escutcheons at penetrations of piping into finished areas. Where finished areas are separated by partitions through which piping passes, provide

escutcheons on both sides of the partition. Where suspended ceilings are installed, attach plates at the underside only of such ceilings. Use chrome plated escutcheons in occupied spaces and conceal openings in building construction. Ensure escutcheons are firmly attached.

3.5 Field Quality Control

A. System Testing

1. Prior to acceptance of the work, test completed systems in the presence of the Contracting Officer. Upon approval, provide certificates of testing.

2. Conduct a hydrostatic test, unless otherwise specified. Use only potable water for testing.

3. Perform full-flow system operating tests for standpipe systems.

4. Prepare and maintain test records of piping-system tests. Ensure records show personnel responsibilities, dates, test-gage identification numbers, ambient and test-water temperatures, pressure ranges, rates of pressure drops, and leakage rates. Each test acceptance requires the signature of the Contracting Officer.

B. Test Gauges

1. Acceptable test gages have 4-1/2-inch dials or larger with accuracy of plus or minus 1/2 of 1 percent of full-scale range and dial graduations and pointer width compatible with readability to within one-half of the accuracy extremes.

C. Pneumatic Testing

1. Perform pneumatic Pressure Tests when freezing conditions may occur and upon prior approval by the Contracting Officer. Use oil-free compressed air used for testing.

D. Test and Acceptable Criteria

1. Perform above ground systems pressure tests at 200 psi and maintain the applied pressure without further addition of test media for not less than 2 hours. No pressure drop is allowed.

2. Test backflow prevention into connected potable-water systems and system devices for proper functioning under conditions normal to their application. Repair dripping or weeping joints.

3.6 Adjusting and Cleaning

A. At the completion of the work, clean all parts of the installation. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system. Adjust automatic control devices for proper operation.

3.7 Protection

A. Flushing

1. Before overhead sprinkler piping can be connected to the underground piping, verification of an approved hydrostatic test and flush must be furnished.

END OF SECTION

SECTION 21 13 13

WET PIPE SPRINKLER SYSTEMS FIRE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

A. AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

1. ASSE 1013 (2011) Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers

2. ASSE 1015 (2011) Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies

B. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. AWWA C104/A21.4 (2016) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

2. AWWA C203 (2008) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied

3. AWWA M14 (2015) Manual: Recommended Practice for Backflow Prevention and Cross-Connection Control

C. ASTM INTERNATIONAL (ASTM)

1. ASTM A47/A47M (1999) Standard Specification for Ferritic Malleable Iron Castings

2. ASTM A53/A53M (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

3. ASTM A183 (2014; R 2020) Standard Specification for Carbon Steel Track Bolts and Nuts

4. ASTM A536 (1984) Standard Specification for Ductile Iron Castings

D. FM GLOBAL (FM)

1. FM APP GUIDE (updated on-line) Approval Guide http://www.approvalguide.com/

2. FM 1637 (2010) Flexible Sprinkler Hose with Threaded End Fittings

E. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1. NFPA 13 (2016) Standard for the Installation of Sprinkler Systems

2. NFPA 24 (2016) Standard for the Installation of Private Fire Service Mains and Their Appurtenances

3. NFPA 291 (2016) Recommended Practice for Fire Flow Testing and Marking of Hydrants

4. NFPA 1963 (2019) Standard for Fire Hose Connections

F. UNDERWRITERS LABORATORIES (UL)

1.2 SYSTEM DESCRIPTION

A. Hydraulic Design

1. Basis for Calculations

a. A waterflow test was performed on 6/30/2022 at 201 N Douglas and resulted in a static pressure of 81 psi with a residual pressure of 60 psi while flowing 1300 gpm. Perform a fire hydrant flow test prior to shop drawing submittal in accordance with NFPA 291. Results must include hydrant elevations relative to the building and hydrant number/identifiers for the tested hydrants, including which were flowed, which had a gauge. This information must be presented in a tabular form if multiple hydrants were flowed. The results must be included with the hydraulic calculations. Hydraulic calculations must be based on flow test noted in this paragraph. Hydraulic calculations must be based upon the Hazen-Williams formula with a "C" value noted in NFPA 13 for piping.

2. Hydraulic Calculations

a. Water supply curves and system requirements must be plotted on semi-logarithmic graph.

b. Provide a summary sheet listing sprinklers in the design area and their respective hydraulic reference points, elevations, minimum discharge pressures and minimum flows. Elevations of hydraulic reference points (nodes) must be indicated.

c. Documentation must identify each pipe individually and the nodes connected thereto. Indicate the diameter, length, flow, velocity, friction loss, number and type fittings, total friction loss in the pipe, equivalent pipe length and Hazen-Williams coefficient for each pipe.

d. Where the sprinkler system is supplied by interconnected risers, the sprinkler system must be hydraulically calculated using the hydraulically most demanding single riser. The calculations must not assume the simultaneous use of more than one riser.

e. All calculations must include the backflow preventer manufacturer's stated friction loss at the design flow.

f. All calculations must be performed back to the actual location of the flow test, taking into account the direction of flow in the service main at the test location.

g. For gridded systems, calculations must show peaking of demand area friction loss to verify that the hydraulically most demanding area is being used. A flow diagram indicating the quantity and direction of flows must be included.

3. Design Criteria

a. Hydraulically design the system to discharge a minimum density as indicated on the drawings or must be in accordance with the Area/Density Method of NFPA 13. Add an allowance for exterior and interior hose streams as required by NFPA 13.

B. Sprinkler Coverage

1. Sprinklers must be uniformly spaced on branch lines. Provide coverage throughout 100 percent of the area noted on the Contract drawings. This includes, but is not limited to, telephone rooms, electrical equipment rooms (regardless of the fire resistance rating of the enclosure), boiler rooms, switchgear rooms, transformer rooms, attached electrical vaults and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13. Provide sprinklers below all obstructions in accordance with NFPA 13.

C. Qualified Fire Protection Engineer (QFPE)

1. An individual who is a licensed professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and has relevant fire protection engineering experience.

1.3 SUBMITTALS

A. Shop drawings, product data and calculations must be prepared by the designer and combined and submitted as one complete package. The QFPE must review the submittal package for completeness and compliance with the Contract provisions prior to submission.

B. Submit the following:

1. Shop Drawings

2. Product Data

a. Pipe

b. Fittings

c. Valves, including gate, check, butterfly, and globe

d. Alarm Valves

e. Relief Valves

f. Sprinklers

g. Pipe hangers and Supports

h. Sprinkler alarm switch

i. Valve supervisory (tamper) switch

j. Fire department connection

k. Backflow prevention assembly

l. Air vent

m. Hose valve

n. Seismic bracing

o. Nameplates

3. Design Data

   a. Seismic bracing

   b. Load calculations for sizing of seismic bracing

   c. Hydraulic calculations

4. Test Reports

   a. Test procedures

5. Certificates

   a. Verification of Compliant Installation

6. Operation and Maintenance Data

   a. Operating and Maintenance (O&M) Instructions

   b. Spare Parts Data

7. Closeout Submittals

   a. As-built drawings

1.4 QUALITY ASSURANCE

A. Preconstruction Submittals - Within 36 days of contract award but no less than 14 days prior to commencing work on site, the prime Contractor must submit drawings, calculations and product data for review and approval.

1. Shop Drawing -copies of the shop drawings, no later than 28 days prior to the start of system installation. Working drawings conforming to the requirements prescribed in NFPA 13. Each set of drawings must include the following:

a. A descriptive index with drawings listed in sequence by number. A legend sheet identifying device symbols, nomenclature, and conventions used in the package.

b. Floor plans drawn to a scale not less than 1/8-inch equals 1-foot clearly showing locations of devices, equipment, risers, and other details required to clearly describe the proposed arrangement.

c. Actual center-to-center dimensions between sprinklers on branch lines and between branch lines; from end sprinklers to adjacent walls; from walls to branch lines; from sprinkler feed mains, cross mains and branch lines to finished floor and roof or ceiling.

d. Longitudinal and transverse building sections showing typical branch line and cross main pipe routing, elevation of each typical sprinkler above finished floor and elevation of "cloud" or false ceilings in relation to the building ceilings.

e. Plan and elevation views which establish that the equipment will fit the allotted spaces with clearance for installation and maintenance.

f. Riser layout drawings drawn to a scale of not less than 1/2-inch equals 1-foot to show details of each system component, clearances between each other and from other equipment and construction in the room.

g. Details of each type of riser assembly, pipe hanger, sway bracing for earthquake protection, and restraint of underground water main at point-of-entry into the building, and electrical devices and interconnecting wiring. The dimension from the edge of vertical piping to the nearest adjacent wall(s) must be indicated on the drawings when vertical piping is located in stairs or other portions of the means of egress.

h. Details of each type of pipe hanger, seismic bracing/restraint and related components.

i. Include fire pump curve with shop drawings and hydraulic calculations, if applicable.

2. Product Data

a. Annotated catalog data to show the specific model, type, and size of each item. The data must be highlighted to show model, size, options, and other pertinent information, that are intended for consideration. Data must be adequate to demonstrate compliance with all contract requirements. Product data for all equipment must be combined into a single submittal.

3. Hydraulic Calculations

a. Calculations must be as outlined in NFPA 13 except that calculations must be performed by computer using software intended specifically for fire protection system design using the design data shown on the drawings.

4. Operating and Maintenance Instructions

a. Provide 3 hard copy manuals and one pdf version on electronic media. The manuals must include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment.

B. Qualifications

1. Sprinkler System Designer

a. The sprinkler system designer must be certified as a Level III Technician by National Institute for Certification in Engineering Technologies (NICET) in the Water-Based Systems Layout subfield of Fire Protection Engineering Technology.

2. Sprinkler System Installer

a. The sprinkler system installer must be regularly engaged in the installation of the type and complexity of system specified in the contract documents, and must have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

C. Regulatory Requirements

1. Equipment and material must be listed or approved. Listed or approved, as used in this Section, means listed, labeled or approved by a Nationally Recognized Testing Laboratory (NRTL) such as UL Fire Prot Dir or FM APP GUIDE. The omission of these terms under the description of an item or equipment described must not be construed as waiving this requirement. All listings or approvals by testing laboratories must be from an existing ANSI or UL published standard. The recommended practices stated in the manufacturer's literature or documentation are mandatory requirements.

1.5 Delivery, Storage, and Handling

A. Protect all equipment delivered and placed in storage from the weather, excessive humidity and temperature variations, dirt and dust, or other contaminants. All pipes must be either capped or plugged until installed.

1.6 Extra Materials

A. Spare sprinklers and wrench(es) must be provided as spare parts in accordance with NFPA 13.

PART 2 Products

2.1 Materials and Equipment

A. Standard Products

1. Provide materials, equipment, and devices listed for fire protection service when so required by NFPA 13 or this specification. Select material from one manufacturer, where possible, and not a combination of manufacturers, for a classification of material. Material and equipment must be standard products of a manufacturer regularly engaged in the manufacture of the products for at least 2 years prior to bid.

B. Nameplates

1. Major components of equipment must have the manufacturer's name, address, type or style, model or serial number, catalog number, date of installation, installing Contractor's name and address, and the contract number provided on a new name plate permanently affixed to the item or equipment. Nameplates must be etched metal or plastic, permanently attached by screws to control units, panels or adjacent walls.

C. Identification and Marking

1. Pipe and fitting markings must include name or identifying symbol of manufacturer and nominal size. Pipe must be marked with ASTM designation. Valves and equipment markings must have name or identifying symbol of manufacturer, specific model number, nominal size, name of device, arrow indicating direction of flow, and position of installation (horizontal or vertical), except if valve can be installed in either position. Markings must be included on the body casting or on an etched or stamped metal nameplate permanently on the valve or cover plate.

D. Pressure Rating

1. Valves, fittings, couplings, alarm switches, and similar devices must be rated for the maximum working pressures that can be experienced in the system, but in no case less than 175 psi.

2.2 Aboveground Piping Components

A. Steel Piping Components

1. Steel Pipe

    a. Except as modified herein, steel pipe must be black as permitted by NFPA 13 and conform to the applicable provisions of ASTM A53/A53M, ASTM Al35/Al35M or ASTM Al53/Al53M.

    b. Steel pipe must be minimum Schedule 40 for sizes 2 inches and less; and minimum Schedule 10 for sizes larger than 2 inches.

2. Fittings

    a. Fittings must be welded, threaded, or grooved-end type. Threaded fittings must be cast-iron conforming to ASME Bl6.4, malleable-iron conforming to ASME Bl6.3 or ductile-iron conforming to ASTM A536. Plain-end fittings with mechanical couplings, fittings that use steel gripping devices to bite into the pipe, steel press fittings and field welded fittings are not permitted. Fittings, mechanical couplings, and rubber gaskets must be supplied by the same manufacturer. Threaded fittings must use Teflon tape or manufacturer's approved joint compound. Saddle tees using rubber gasketed fittings are permitted only when connecting to existing piping for additions or modifications. Saddle tees must use a connection method that completely wraps around the pipe. Reducing couplings are not permitted except as allowed by NFPA 13.

3. Grooved Mechanical Joints and Fittings

    a. Joints and fittings must be designed for not less than 175 psi service and the product of the same manufacturer. Field welded fittings must not be used. Fitting and coupling housing must be malleable-iron conforming to ASTM A47/A47M, Grade 32510; ductile-iron conforming to ASTM A536, Grade 65-45-12. Rubber gasketed grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 2 inches and larger. Gasket must be the flush type that fills the entire cavity between the fitting and the pipe. Nuts and bolts must be heat-treated steel conforming to ASTM A183 and must be cadmium-plated or zinc-electroplated.

4. Flanges

    a. Flanges must conform to NFPA 13 and ASME 816.1. Gaskets must be non-asbestos compressed material in accordance with ASME 816.21, 1/16-inch thick, and full face or self-centering flat ring type.

B. Flexible Sprinkler Hose

1. The use of flexible hose is permitted. Flexible sprinkler hose must comply with UL 2443 and FM 1637.

C. Pipe Hangers and Supports

1. Provide galvanized pipe hangers, supports and seismic bracing in accordance with NFPA 13. Design and install seismic protection in accordance with the

requirements of NFPA 13 section titled "Protection of Piping Against Damage Where Subject to Earthquakes for Seismic Design Category as designated by the Structural Engineer of Record.

D. Valves

1. Provide valves of types approved for fire service. Valves must open by counterclockwise rotation.

2. Control Valve

a. Manually operated sprinkler control/gate valve must be outside stem and yoke (OS&Y) type or butterfly type as indicated on the drawings and must be listed.

3. Check Valves

a. Check valves must comply with UL 312

4. Hose Valve

a. Valve must comply with UL 668.

2.3 Alarm Initiating and Supervisory Devices

A. Sprinkler Alarm Switch

1. Vane or pressure-type flow switch(es). Connection of switch must be by the fire alarm installer. Vane type alarm actuating devices must have mechanical diaphragm controlled retard device adjustable from 10 to 60 seconds and must instantly recycle. Flow switches for elevator power shunt must not have a retard feature.

B. Valve Supervisory (Tamper) Switch

1. Switch must be integral to the control valve or suitable for mounting to the type of control valve to be supervised open..

2.4 Sprinklers

A. Sprinklers must comply with UL 199 and NFPA 13. Sprinklers with internal 0-rings are not acceptable. Sprinklers in high heat areas including attic spaces or in close proximity to unit heaters must have temperature classification in accordance with NFPA 13. Extended coverage sprinklers are permitted for loading docks, residential occupancies and high-piled storage applications only.

B. Upright Sprinkler

1. Upright sprinkler must be quick response with an architect approved finish and have a nominal K-factor of 5.6.

C. Corrosion-Resistant Sprinkler

1. Corrosion-resistant sprinkler must be the upright type installed in locations as indicated. Corrosion-resistant coatings must be factory-applied by the sprinkler manufacturer.

2.5 Accessories

A. Sprinkler Cabinets

1. Provide spare sprinklers in accordance with NFPA 13 and must be placed in a suitable metal or plastic cabinet of sufficient size to accommodate all the spare sprinklers and wrenches in designated locations. Spare sprinklers must be representative of, and in proportion to, the number of each type and temperature rating of the sprinklers installed as required by NFPA 13. At least one wrench of each type required must be provided.

B. Pipe Escutcheon

1. Provide split hinge metal plates for piping entering walls, floors, and ceilings in exposed spaces. Provide polished stainless steel plates or chromium-plated finish on copper alloy plates in finished spaces. Provide paint finish on metal plates in unfinished spaces.

C. Sprinkler Guard

1. Listed guard must be a steel wire cage designed to encase the sprinkler and protect it from mechanical damage. Guards must be provided on sprinklers located within 7 feet of the floor and/or as indicated.

D. Relief Valve

1. Relief valves must be listed and installed at the riser in accordance with NFPA 13.

E. Air Vent

1. Air vents must be of the automatic type and piped to drain to the building exterior.

F. Identification Sign

1. Valve identification sign must be minimum 6 inches wide by 2 inches high with enamel baked finish on minimum 18 gage steel or 0.024-inch aluminum with red letters on a white background or white letters on red background. Wording of sign must include, but not be limited to "main drain", "auxiliary drain", "inspector's test", "alarm test", "alarm line", and similar wording as required to identify operational components. Where there is more than one sprinkler system, signage must include specific details as to the respective system.

PART 3 Execution

3.1 Verifying Actual Field Conditions

A. Before commencing work, examine all adjoining work on which the contractor's work that is dependent for perfect workmanship according to the intent of this specification section, and report to the Contracting Officer's Representative a condition that prevents performance of first class work. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed before submittal of a proposal.

3.2 Installation

A. The installation must be in accordance with the applicable provisions of NFPA 13, NFPA 24 and publications referenced therein. Locate sprinklers in a consistent pattern with ceiling grid, lights, and air supply diffusers. Install sprinkler system over and under ducts, piping and platforms when such equipment can negatively affect or disrupt the sprinkler discharge pattern and coverage.

1. Piping offsets, fittings, and other accessories required must be furnished to provide a complete installation and to eliminate interference with other construction.

2. Wherever the contractor's work interconnects with work of other trades the Contractor must coordinate with other Contractors to ensure all Contractors have the information necessary so that they may properly install all necessary connections and equipment.

3. Provide required supports and hangers for piping, conduit, and equipment so that loading will not exceed allowable loadings of structure. Submittal of a bid must be a deemed representation that the contractor submitting such bid has ascertained allowable loadings and has included in his estimates the costs associated in furnishing required supports.

B. Waste Removal

1. At the conclusion of each day's work, clean up and stockpile on site all waste, debris, and trash which may have accumulated during the day as a result of work by the contractor and of his presence on the job. Sidewalks and streets adjoining the property must be kept broom clean and free of waste, debris, trash and obstructions caused by work of the contractor, which will affect the condition and safety of streets, walks, utilities, and property.

3.3 Aboveground Piping Installation

A. The methods of fabrication and installation of the aboveground piping must fully comply with the requirements and recommended practices of NFPA 13 and this specification section.

B. Protection of Piping Against Earthquake Damage

1. Seismic restraint is required.

C. Piping in Exposed Areas

1. Install exposed piping without diminishing exit access widths, corridors or equipment access. Exposed horizontal piping, including drain piping, must be installed to provide maximum headroom.

D. Piping in Finished Areas

1. In areas with suspended or dropped ceilings and in areas with concealed spaces above the ceiling, piping must be concealed above ceilings. Piping must be inspected, hydrostatically tested and approved before being concealed. Risers and similar vertical runs of piping in finished areas must be concealed.

E. Upright Sprinklers

1. Riser nipples or "sprigs" to upright sprinklers must contain no fittings between the branch line tee and the reducing coupling at the sprinkler.

F. Pipe Joints

1. Pipe joints must conform to NFPA 13, except as modified herein. Not more than four threads must show after joint is made up. Welded joints will be permitted, only if welding operations are performed as required by NFPA 13 at the Contractor's fabrication shop, not at the project construction site. Flanged joints must be provided where indicated or required by NFPA 13. Grooved pipe and fittings must be prepared in accordance with the manufacturer's latest published specification according to pipe material, wall thickness and size. Grooved couplings, fittings and grooving tools must be products of the same manufacturer. For copper tubing, pipe and groove dimensions must comply with the tolerances specified by the coupling manufacturer. The diameter of grooves made in the field must be measured using a "go/no-go" gauge, vernier or dial caliper, narrow-land micrometer, or other method specifically approved by the coupling manufacturer for the intended application. Groove width and dimension of groove from end of pipe must be measured and recorded for each change in grooving tool setup to verify compliance with coupling manufacturer's tolerances.

G. Reducers

1. Reductions in pipe sizes must be made with one-piece tapered reducing fittings. When standard fittings of the required size are not manufactured, single bushings of the face or hex type will be permitted. Where used, face bushings must be installed with the outer face flush with the face of the fitting opening being reduced. Bushings cannot be used in elbow fittings, in more than one outlet of a tee, in more than two outlets of a cross, or where the reduction in size is less than 1/2-inch.

H. Pipe Penetrations

1. Cutting structural members for passage of pipes or for pipe-hanger fastenings will not be permitted. Pipes that must penetrate concrete or masonry walls or concrete floors must be core-drilled and provided with pipe sleeves. Each sleeve must be Schedule 40 galvanized steel, ductile-iron or cast-iron pipe and extend through its respective wall or floor and be cut flush with each wall surface.

Sleeves must provide required clearance between the pipe and the sleeve per NFPA 13. The space between the sleeve and the pipe must be firmly packed with mineral wool insulation.

2. Where pipes and sleeves penetrate fire walls, fire partitions, or floors, pipes/sleeves must be firestopped.

3. In penetrations that are not fire-rated or not a floor penetration, the space between the sleeve and the pipe must be sealed at both ends with plastic waterproof cement that will dry to a firm but pliable mass or with a mechanically adjustable segmented elastomer seal.

I. Escutcheons

1. Escutcheons must be provided for pipe penetration in finished areas of ceilings, floors and walls. Escutcheons must be securely fastened to the pipe at surfaces through which piping passes.

J. Inspector’s Test Connection

1. Unless otherwise indicated, the test connection must consist of 1-inch pipe connected at the riser as a combination test and drain valve; a test valve located approximately 7 feet above the floor; a smooth bore brass outlet equivalent to the smallest orifice sprinkler used in the system; and a painted metal identification sign affixed to the valve with the words "Inspector's Test". All test connection piping must be inside of the building and penetrate the exterior wall at the location of the discharge orifice only. The discharge orifice must be located outside the building wall no more than 2 feet above finished grade, directed so as not to cause damage to adjacent construction or landscaping during full flow discharge, or to the sanitary sewer. Discharge to the exterior must not interfere with exiting from the facility. Water discharge or runoff must not cross the path of egress from the building. Do not discharge to the roof. Discharge to floor drains, janitor sinks or similar fixtures is not permitted.

2. Provide concrete splash block at drain and inspector's test connection discharge locations if not discharging to a concrete surface. Splash blocks must be large enough to mitigate erosion and not become dislodged during a full flow of the drain. Ensure all discharged water drains away from the facility and does not cause property damage.

K. Drains

1. Main drain piping must be provided to discharge at a safe point outside the building, no more than 2 feet above finished grade, or to the sanitary sewer where dictated by jurisdiction. Provide a concrete splash block at drain outlet. Discharge to the exterior must not interfere with exiting from the facility. Water discharge or runoff must not cross the path of egress from the building.

2. Auxiliary drains must be provided as required by NFPA 13. Auxiliary drains are permitted to discharge to a floor drain if the drain is sized to accommodate full

flow (min 40 gpm). Discharge to service sinks or similar plumbing fixtures is not permitted.

L. Identification Signs

1. Signs must be affixed to each control valve, inspector test valve, main drain, auxiliary drain, test valve, and similar valves as appropriate or as required by NFPA 13.

3.4 Electrical

A. Alarm signal wiring connected to the building fire alarm control system must be by the fire alarm installer.

3.5 Field Quality Control

A. Correction of Deficiencies

1. If equipment was found to be defective or non-compliant with contract requirements, perform corrective actions and repeat the tests. Tests must be conducted and repeated if necessary until the system has been demonstrated to comply with all contract requirements.

3.6 Minimum System Tests

A. The system, including the underground water mains, and the aboveground piping and system components, must be tested to ensure that equipment and components function as intended. The underground and aboveground interior piping systems and attached appurtenances subjected to system working pressure must be tested in accordance with NFPA 13.

B. Aboveground Piping

1. Hydrostatic Test

a. Aboveground piping must be hydrostatically tested in accordance with NFPA 13. There must be no drop in gauge pressure or visible leakage when the system is subjected to the hydrostatic test. The test pressure must be read from a gauge located at the low elevation point of the system or portion being tested.

2. Backflow Prevention Assembly Forward Flow Test

a. Each backflow prevention assembly must be tested at system flow demand, including all applicable hose streams, as specified in NFPA 13. The Contractor must provide all equipment and instruments necessary to conduct a complete forward flow test, including 2.5-inch diameter hoses, playpipe nozzles or flow diffusers, calibrated pressure gauges, and pitot tube gauge. The Contractor must provide all necessary supports to safely secure hoses and nozzles during the test. At the system demand flow, the pressure readings and pressure drop (friction loss) across the assembly must be

recorded. A metal placard must be provided on the backflow prevention assembly that lists the pressure readings both upstream and downstream of the assembly, total pressure drop, and the system test flow rate determined during the preliminary testing. The pressure drop must be compared to the manufacturer's data and the readings observed during the final inspections and tests.

C. Main Drain Flow Test

1. Following flushing of the underground piping, a main drain test must be made to verify the adequacy of the water supply.

3.7 System Acceptance

A. Following acceptance of the system, as-built drawings and O&M manuals must be delivered to the Contracting Officer for review and acceptance. Submit six sets of detailed as-built drawings. The drawings must show the system as installed, including deviations from both the project drawings and the approved shop drawings. These drawings must be submitted within two weeks after the final acceptance test of the system. At least one set of as-built (marked-up) drawings must be provided at the time of, or prior to the final acceptance test.

1. Provide one set of full size paper as-built drawings and schematics. The drawings must be prepared electronically and sized no less than the contract drawings.

2. Provide operating and maintenance (O&M) instructions.

3.8 Onsite Training

A. Conduct a training course for the responding fire department and operating and maintenance personnel as designated by the Contracting Officer. The on-site training must cover all of the items contained in the approved Operating and Maintenance Instructions.

END OF SECTION

SECTION 28 31 00

ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. This specification is meant to compliment the entire contract documents, including but not limited to manuals, cut sheets, drawings, RFI response, addendums and bulletins.

1.02 Scope

A. This section of the specification includes the furnishing, installation, and connection of an intelligent reporting, microprocessor controlled, addressable, fire detection and emergency voice alarm communication system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, auxiliary control devices, annunciators, power, and voice.

B. This specification document provides the requirements for the installation, programming and configuration of a complete digital protocol addressable fire alarm system. This system shall include, but not be limited to, system cabinet, power supply, built in Signaling Line Circuit (SLC), annunciator, six programmable circuits, built in dual line Digital Communicator associated peripheral devices, batteries, wiring, conduit and other relevant components and accessories required to furnish a complete and operational Life Safety System.

C. The system shall be an active/interrogative type system where each addressable device is repetitively scanned, causing a signal to be transmitted to the main fire alarm control panel (FACP) indicating that the device and its associated circuit wiring is functional. Loss of this signal at the main FACP shall result in a trouble indication as specified hereinafter for the particular input.

D. The facility shall have an emergency voice alarm communication system. Digitally stored message sequences shall notify the building occupants that a fire or life safety condition has been reported. Message generator(s) shall be capable of automatically distributing up to eight (8) simultaneous, unique messages to appropriate audio zones within the facility based on the type and location of the initiating event. The Fire Command Center (FCC) shall also support Emergency manual voice announcement capability for both system wide or selected audio zones, and shall include provisions for the system operator to override automatic messages system wide or in selected zones.

E. Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Command Center (FCC) and designated personnel in other buildings at the site via a multiplex communication network.

F. The fire alarm system devices shall be manufactured by an ISO 9001 certified

company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

1.03 Work Included

A. General Requirements

The contractor shall furnish and install a complete 24 VDC, electrically supervised, analog addressable fire alarm system as specified herein and indicated on the drawings. The system shall include but not be limited to all control panels, power supplies, initiating devices, audible and visual notification appliances, alarm devices, and all accessories required to provide a complete operating fire alarm system.

B. Listings

All fire alarm system equipment shall be listed for it's intended purpose and be compatibility listed to assure the integrity of the complete system.

1.04 REFERENCES

A. All work and materials shall conform to all applicable Federal, State and local codes and regulations governing the installation.

B. Fire alarm system, equipment, installation, and wiring materials and methods used shall comply with the following codes and standards:

1. System components proposed in this specification shall be UL listed for its intended use.
2. California State Fire Marshall Listed Components.
3. California Code of Regulations (C.C.R) applicable codes listed on the drawings and specifications.

1.05 BUILDING CODES and STANDARDS

A. Apply latest adopted versions of all codes and standards unless these specifications stipulate a specific version

B. National Fire Protection Association (NFPA):

1. NFPA-70 National Electrical Code (NEC)
2. NFPA-72 National Fire Alarm Code

a. Chapter 12 - Emergency Communications ROP-568 shall be applied to this project as if it were part of the approved NFPA-72.

3. NFPA 101 Life Safety Code
4. IBC International Building Code
5. IFC International Fire Code
6. IMC International Mechanical Code

C. National Electrical Manufacture's Association (NEMA)

D. Underwriters Laboratories, Inc. (UL)

1. UL-864 Control Units for Fire Protective Signaling Systems (9th Edition)
2. UL-268 Smoke Detector for Fire Protective Signaling Systems
3. UL-268A Smoke Detectors for Duct Applications
4. UL-521 Heat Detectors for Fire Protective Signaling Systems
5. UL-464 Audible Signaling Appliances
6. UL-1971 Signaling Devices for the Hearing Impaired
7. UL-38 Manually Actuated Signaling Boxes
8. UL-1480 Speakers for Fire Alarm, Emergency, and Commercial and Professional Use
9. UL-1481 Power Supplies for Fire Protective Signaling Systems
10. UL-1638 Signaling Appliances – Private Mode Emergency and General Utility Signaling
11. UL 2572 Control and Communication Units for Emergency Voice/Alarm Communication (EVAC) Systems
12. Note control equipment that is not dually UL 864 and 2572 listed are not acceptable.

1.06 General Requirements

A. Manufacturers/Distributors Services:

1. The following supervision shall be provided by a factory trained service technician from the distributor of the fire alarm equipment. The technician shall be trained and shall have a minimum of (5) years of service experience in the fire alarm industry. The technicians name shall appear on equipment submittals and a copy of his manufactures trained shall be sent to the project engineer. The technician shall be responsible for the following items:

    a. A pre-installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
    b. During the installation the certified technician shall be on site or make periodic visits to verify installation and wiring of the system. He shall also supervise the completion of conduit rough, wires pulled into conduit and wiring rough, and ready for trim.
    c. Upon completion of wiring, final checkout and certification of the system shall be made under the supervision of this technician.
    d. At the time of the formal checkout, technician shall give operational instructions to the owner and or his representative on the system.

B. Owner Approval

1. Fire alarm, signal, and control equipment shall be reviewed by the Architect / Engineer / Engineer, in addition to other required approvals. Fire alarm system shall pass State of California Regulation 4 test administered by the Owner.
2. Certification: Installation of fire alarm system shall not start until Shop Drawings, including State Fire Marshal listing numbers of fire alarm components, are submitted through the Architect / Engineer, and approved by DSA. Written certification by fire alarm equipment distributor or manufacturer shall be submitted

to the Architect / Engineer and DSA, stating the system and its component parts are as approved and listed by the State Fire Marshal and that installation conforms to requirements set forth in CBC.

3. Equipment and services described in this section represent those supplied and supported by the Manufacturer(s) listed on the drawings, unless noted otherwise.

C. Qualifications

1. Contractor shall hold a current certification as a Honeywell partner.

2. Contractor shall be currently licensed in good standing by the California Contractors' State License Board and have qualified personnel and/or subcontractors for each discipline required for the full scope of work. A C-16 license is a minimum requirement.

3. Contractor shall hold a valid State of California, Division of Apprenticeship Standards (DAS), Fire/Life Safety Technical Certification.

D. Submittals

The contractor shall submit a digital submittal with searchable PDFs. Scanned documents will not be accepted. Submit documentation within thirty (30) calendar days after award of the purchase order. Indicated in the document will be the type, size, rating, style, catalog number, manufacturers names, photos, and /or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the approval of the Architect / Engineer and no equipment shall be ordered or installed on the premises without that approval. All equipment and devices on the shop drawings to be furnished under this contract shall be clearly marked in the specification sheets.

E. Suppliers' qualifications shall be submitted indicating years in business, service policies, warranty definitions, NICET certification, Contractor Licenses, Honeywell partner certification, DAS Certification, and completion of factory training program and a list of similar installations.

F. Contractor qualifications shall be supplied indicating years in business and prior experience with installations that include the type of equipment that is to be supplied.

G. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final check-out and to ensure the systems integrity.

The contractor shall provide hourly Service Rates, performed by a factory trained technician for this installed Life Safety System with the submittal. Proof of training and authorization shall be included with the submittal. These hourly service rates shall be guaranteed for a 1-year period.

H. Contract close-out Submittals

Deliver digital and two (2) copies of the following to the owner's representative within Thirty (30) days of system acceptance. The closeout submittals shall include:

1. Installation and Programming manuals for the installed Life Safety System.
2. Point to point diagrams of the entire Life Safety System as installed. This shall include all connected Smoke Detectors and addressable field modules.
3. All drawings must reflect device address as verified in the presence of the engineer and/or end user.

I. Warranty

Warranty all materials, installation and workmanship for a one (1) year period, unless otherwise specified. A copy of the manufacturer warranty shall be provided with the close out documentation.

J. Approvals:

The system shall have proper listing and/or approval from the following nationally recognized agencies:

UL Underwriters Laboratories Inc

The Fire Alarm Control Panel and all transponders shall meet the modular listing requirements of Underwriters Laboratories, Inc. Each subassembly, including all printed circuits, shall include the appropriate UL modular label. This includes all printed circuit board assemblies, power supplies, and enclosure parts. Systems that do not include modular labels may require return to the factory for system upgrades and are not acceptable.

K. Products

This Life Safety System Specification must be conformed to in its entirety to ensure that the installed and programmed Life Safety System will accommodate all the requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to the bid date will be required to be met without exception.

Submission of product purported to be equal to those specified herein will be considered as possible substitutes only when all the following requirements have been met:

1. Any deviation from the equipment, operations, methods, design or other criteria specified herein must be submitted in detail to the specifying Architect / Engineer a minimum of ten (10) working days prior to the scheduled submission of bids. Each deviation from the operation detailed in these specifications must be documented in detail, including page number and section number, which lists the system function for which the substitution is being proposed.
2. Complete list of such substituted products with three (3) copies of working drawings thereof shall be submitted to the approved Architect / Engineer not less than ten (10) working days prior to the scheduled submission of bids.
3. The contractor or substitute bidder shall functionally demonstrate that the proposed substitute products are in fact equal in quality and performance to those specified herein.

L. General Equipment and Materials Requirements

All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities covered by this specification or noted on the contract drawings and installation specification shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this specification is provided by different manufacturers, then that equipment shall be “Listed” as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards.

M. Satisfying the Entire Intent of these Specifications

It is the contractor’s responsibility to meet the entire intent of these specifications.

Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the Architect / Engineer, engineer, and owner’s representative.

All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the electrical contractor.

N. CONDUIT AND WIRE

1. Conduit:

    a. Conduit shall be in accordance with The National Electrical Code (NEC), NFPA 72, California Electrical Code (CEC), California Fire Code (CFC) and California State Fire Marshall (CSFM).
    b. All wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross-sectional area where three or more cables are contained within a single conduit.
    c. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per CEC Article 760-29.
    d. Wiring for 24-volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
    e. Conduit shall not enter the fire alarm control panel or any other remotely mounted control panel equipment or back boxes, except where conduit entry is specified by the FACP manufacturer.
    f. Conduit shall be 3/4 inch minimum for interior spaces and 1” minimum underground.

2. Wire

    a. All fire alarm system wiring must be new.
    b. Wiring shall be in accordance with The National Electrical Code (NEC), NFPA 72, California Electrical Code (CEC), California Fire Code (CFC), California

State Fire Marshall (CSFM) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for initiating device circuits and signaling line circuits, and 14 AWG (1.63 mm) for notification appliance circuits.

c. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system. All cables installed exterior and underground shall be UL listed for wet location and rated per UL requirements. All underground conductors shall be West Penn “Aqua Seal” rated or equal approved by College.
d. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
e. The system shall permit the use of IDC and NAC wiring in the same conduit with the multiplex communication loop.
f. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.
g. All analog voice speaker and analog telephone circuits shall use twisted/shielded pair to eliminate cross talk.

O. TERMINAL BOXES, JUNCTION BOXES AND CABINETS:

1. All boxes and cabinets shall be UL listed for their intended purpose.
2. Initiating circuits shall be arranged to serve like categories (manual, smoke, water flow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.
3. The fire alarm equipment shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold-water pipe or grounding rod.

PART 2 - PRODUCTS

2.01 GENERAL

A. System Wiring

The Signaling Line Circuit (SLC) and Data Communication Bus (S-BUS) shall be wired with standard NEC 760 compliant wiring, no twisted, shielded or mid capacitance wiring is required for standard installations. All FACP screw terminals shall be capable of accepting 14-18 AWG wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC) and also comply with article 760 of the NEC.

B. Signaling Line Circuits

Each SLC shall be capable of a wiring distance of 10,000 feet from the SLC driver module (5815XL) and be capable of supporting 99 detectors and 99 addressable module devices. The communication protocol to SLC devices must be digital. Any SLC loop device, which goes into alarm, must interrupt the polling cycle for priority response from the FACP. The FACP must respond consistently to a device that goes into alarm on an SLC in under 3 seconds. The auxiliary 5815XL SLC loop module must be capable of being located up to 6000 feet from the FACP on an RS-485 bus, which is separate from the SLC bus. The SLC shall be capable of functioning in a class A or class B configuration.

C. SLC loop devices

Devices supported must include addressable photoelectric, ionization smoke detectors, addressable heat detectors, addressable input modules, relay output modules or addressable notification modules. There is to be no limit to the number of any particular device type up to the maximum of 99 detectors and 99 addressable modules that can be connected to the SLC.

Provide Identification labels at each device matching the device ID number shown on the riser diagrams.

D. Addressable detector functions

The products of combustion detectors must communicate analog values using a digital protocol to the control panel for the following functions:

1. Automatic compliance with NFPA 72 standards for detector sensitivity testing
2. Drift compensation to assure detector is operating correctly.
3. Maintenance alert when a detector nears the trouble condition.
4. Trouble alert when a detector is out of tolerance.
5. Alert control panel of analog values that indicate fire.

E. Programmable Circuits

The FACP shall support six (6) programmable circuits that are capable of being

programmed as supervised reverse polarity notification circuits or supervised auxiliary power circuits that can be programmed as continuous, resettable or door holder power. The circuits shall also be programmable as input circuits in class A or B configurations to support dry contact or compatible two wire smoke detectors.

F. Addressable Notification Module

The contractor shall furnish and install where indicated on the plans, addressable notification modules. The modules shall be U.L. listed compatible with the FACP. The notification module must provide one class A (Style Z) or class B (Style Y) notification output with one auxiliary power input. The notification module must be suitable for mounting in a standard 4 square electrical box and must include a plastic cover plate. The notification module must provide an LED that is visible from the outside of the cover plate. The notification module must be fully programmable for such applications as required by the installation. The module shall reside on the SLC loop and can be placed up to 10,000ft.from the control or SLC loop module.

G. Annunciators

The main control must have a built-in annunciator with an 80-character LCD display and feature LED’s for General alarm, Supervisory, System trouble, System Silence and Power. When in the normal condition the LCD shall display time and date based on a 200-year clock which is capable of automatic daylight savings time adjustments. All controls and programming keys are silicone mechanical type with tactile and audible feedback. Keys have a travel of .040 inches. No membrane style buttons will be permissible. The annunciator must be able to silence and reset alarms through the use of a keypad entered code, or by using a firefighter’s key. The annunciators must have twenty levels of user codes that will allow the limitation of operating system programming to authorized individuals.

H. Remote Annunciators

The fire system shall be capable of supporting up to eight remote annunciators. LCD Remote annunciators shall have the same control and display layout so that they match identically the built-in annunciator. LED Remote annunciators shall have individually mapped LED’s and reset and silence inputs. The reset and silence inputs must use the same firefighters key as the LCD annunciators. Remote annunciators shall be capable of operating at a distance of 6000 feet from the main control panel on unshielded non-twisted cable.

I. I/O Module

The fire system shall be able to support up to eight I/O modules that shall be used to drive remote LED graphic style displays and accommodate up to eight dry contact type switch inputs. The I/O modules shall each drive up to 40 LEDs without requiring external power connections. The I/O module inputs shall be supervised and be suitable for alarm and trouble circuits as well as reset and silence switches. The system shall also support up to 40 LED drivers that reside on the two-wire SLC loop. These driver boards shall contain 80 LED outputs that are powered by an external power source.

J. Serial/Parallel interface

The fire system shall be capable of supporting up to two serial / parallel interfaces that are capable of driving standard computer style printers. The interface shall be programmable as to what information is sent to it and shall include the ability to print out Detector Status by point, Event History by point and System Programming.

K. Distributed Power Module

The contractor shall supply (where required) a power module model compatible with the FACP. The power module must have 6 amps of output power, six (6) notification circuits rated at 3 amps each, and two form C relay circuits rated at 2.5 amps at 24 volts DC. The six (6) notification circuits shall have the same functionality as the notification circuits on the main panel. The module shall be capable of being connected via a RS-485 system bus (S-BUS) at a maximum distance of 6000 feet from the main control panel. The power module shall contain an additional RS-485 bus that is completely compatible with all add on modules including Remote Annunciators, 5824 serial/parallel modules and addressable devices. The power module will also act as a bus repeater so that additional RS-485 (modules) devices can be connected at a maximum distance of 6000ft. from the power module.

The power module’s RS-485 bus shall be electrically isolated providing ground loop isolation and transient protection.

L. Digital Communicator

The digital communicator must be an integral part of the control panel and be capable of reporting all zones or points of alarm, supervisory, and trouble as well as all system status information such as loss of AC, low battery, ground fault, loss of supervision to any remote devices with individual and distinct messages to a central station or remote station. The communicator must also be capable of up/downloading of all system programming options, Event history and Sensitivity compliance information to a PC on site or at a remote location.

The communicator shall have an answering machine bypass feature that will allow the panel to respond to communication even on phone lines that have other communication equipment present. The communicator must be capable of reporting via SIA and Contact ID formats. The communicator shall have a delayed AC loss report function which will provide a programmable report delay plus a 10-25 min random component to help ease traffic to the central station during a power outage. No controls that use External modems for remote programming and diagnostics shall be accepted.

M. Dry Contacts

The FACP will have three form “C” dry contacts, one will be dedicated to trouble conditions, the other two will be programmable for alarm, trouble, sprinkler supervisory, notification, pre-alarm, waterflow, manual pull, aux. 1 or aux. 2. The trouble contact shall be normal in an electrically energized state so that any total power loss (AC and Backup) will cause a trouble condition. In the event that the Microprocessor on the FACP fails the trouble contacts shall also indicate a trouble condition.

N. Ground Fault Detection

A ground fault detection circuit, to detect positive and negative grounds on all field wiring. The ground fault detector shall operate the general trouble devices as specified but shall not cause an alarm to be sounded. Ground fault will not interfere with the normal operation, such as alarm, or other trouble conditions.

O. Over current Protection

All low voltage circuits will be protected by microprocessor-controlled power limiting or have a self-restoring poly switches for the following: smoke detector power, main power supply, indicating appliance circuits, battery standby power and auxiliary output.

P. Test Functions

“Lamp Test” mode shall be a standard feature of the fire alarm control panel and shall test all LED’s and the LCD display on the main panel and remote annunciators.

A “Walk Test” mode shall be a standard feature of the fire alarm control panel. The walk test feature shall function so that each alarm input tested will operate the associated notification appliance for two seconds. The FACP will then automatically perform a reset and confirm normal device operation. The event memory shall contain the information on the point tested. the zone tripped, the zone restores and the individual points return to normal.

A “Fire Drill” mode shall allow the manual testing of the fire alarm system notification circuits. The “Fire Drill” shall be capable of being controlled at the main annunciator, remote annunciators and via a remote contact input.

A “Bypass Mode” shall allow for any point or nac circuit to be bypassed without effecting the operation of the total fire system.

Q. Remote Input Capabilities

The control panel shall have provisions for supervised switch inputs for the purpose of Alarm reset and Alarm and trouble restore.

R. Notification Appliance Mapping Structure

All notification circuits and modules shall be programmable via a mapping structure that allows for a maximum of 250 output groups. Each of these groups shall have the ability to be triggered by any of the panels 125 Zones. A zone may trigger from groups individually or may contain a global trigger for manual pull stations, fire drills and two different system alarms. Additionally, each Zone will individually control the cadence pattern of each of the Groups that it is “Mapped” to so that sounders can indicate a variety of conditions. The Zone shall be capable of issuing a different cadence pattern for each of the Groups under it’s control. The mapping structure must also allow a group to be designated to “ignore cadence” for use with strobes and other continuous input devices. Zones shall have eight different output categories; Detector alarm, Trouble, Supervisory, Pre-alarm, Waterflow, Manual pull, Zone auxiliary one and Zone

Auxiliary two. Each of the categories shall have the ability to control from 1 to 8 output groups with a cadence pattern. The patterns are; March code, ANSI 3.41, Single Stroke Bell Temporal, California code, Zone 1 coded, Zone 2 coded, Zone 3 coded, Zone 4 coded, Zone 5 coded, Zone 6 coded, Zone 7 coded, Zone 8 coded, Custom output pattern 1, Custom output pattern 2, Custom output pattern 3, Custom output pattern 4, and Constant. This mapping/cadence pattern shall be supported by all system power supplies and Notification Expander Modules.

S. On board programmer

The FACP shall have an on-board programmer which will allow for all system functions and options to be programmed via the on board annunciator keypad. Any panel that does not have this capability will not be accepted.

T. Downloading Software

The fire alarm control panel must support up/downloading of system programming from a PC using a supported Windows operating system. The FACP must also be able to download the detector sensitivity test results and a 1000 event system event buffer to the PC. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built-in digital communicator and shall not require an external modem to be connected to the panel. The downloading software shall contain a code that will block unauthorized persons from accessing the panel via direct connection or over the phone lines.

U. Facility Management Software

The FACP must support a facility management software capable of providing off site access to FACP data that is necessary to manage fire system operation. A software package capable of uploading the detector sensitivity test results and the 1000 event system event buffer to the PC shall be required as part of the bid package. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built in digital communicator. The facility management package must be separate from the downloader package and must not be capable of affecting programmed system options.

V. Service reminder

The FACP shall be capable of automatically generating textual service reminder and the main and remote annunciator LCD’s to inform the user of required testing or service. The service reminder shall not interfere with the normal operation of the FACP.

W. English language descriptions

The FACP shall provide the ability to have a text description of each system device, input zone and output group on the system. The use of individual lights to provide descriptions will not be acceptable.

2.02 SYSTEM OPERATION

A. Alarm

When a device indicates any alarm condition the control panel must respond within 3 seconds. The General Alarm or Supervisory Alarm LED on the annunciator(s) should light and the LCD should prompt the user as to the number of current events. The alarm information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators.

When the alarmed device is restored to normal, the control panel shall be required to be manually reset to clear the alarm condition, except that the alarms may be silenced as programmed.

An alarm shall be silenced by a code or Firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced the silenced LED on the control panel, and on any remote annunciators shall remain lit, until the alarmed device is returned to normal

B. Troubles

When a device indicates a trouble condition, the control panel System Trouble LED should light, and the LCD should prompt the user as to the number of current events. The trouble information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators.

When the device in trouble is restored to normal, the control panel shall be automatically reset, the trouble restore information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators. A trouble shall be silenced by a code or Firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur.

C. Supervision methods

Each SLC loop shall be electrically supervised for opens and ground faults in the circuit wiring and shall be so arranged that a fault condition on any loop will not cause an alarm to sound. Additionally, every addressable device connected to the SLC will be supervised and individually identified if in a fault condition. The occurrence of any fault will light a trouble LED and sound the system trouble sounder but will not interfere with the proper operation of any circuit which does not have a fault condition.

Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder but will not interfere with the proper operation of any circuit which does not have a fault condition.

PART 3 - SYSTEM COMPONENTS

3.01 CONTROL UNIT

A. System Cabinet

1. Mounting
   The system cabinet shall be red and can be either surface or flush mounted. The cabinet door shall be easily removable to facilitate installation and service.
2. Audible System Trouble Sounder
   An audible system trouble sounder shall be an integral part of the control unit. Provisions shall also be provided for an optional supervised remote trouble signal.

B. Power Supply and Charger:

The entire system shall operate on 24 VDC, filtered switch mode power supply with the rated current available of 9 Amps. The FACP must have a battery charging circuit capable of complying with the following requirements:

1. Twenty-four (24) hours of battery standby with five (5) minutes of alarm signaling at the end of this twenty-four (24) hour period (as required per NFPA 72 central station signaling requirements) using rechargeable batteries with automatic charger to maintain gel-cell batteries in a fully charged condition.

The power supply shall comply with U.L. Standard 864 for power limiting.

The FACP will indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A “Battery Test” will be performed automatically every minute to check the integrity of the batteries. The test must disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition.

In the event that it is necessary to provide additional power, provide Distributed Power Modules to accomplish this purpose.

C. Connections and Circuits

Connections to the light and power service shall be on a dedicated branch circuit in accordance with the National Fire Alarm Code NFPA 72, National Electrical Code (NEC) NFPA 70, and the local authority having jurisdiction (AHJ).

The circuit and connections shall be mechanically protected.

A circuit disconnecting means shall be accessible only to authorized personnel and shall be clearly marked “FIRE ALARM CIRCUIT CONTROL”.

PART 4 - ACCESSORY COMPONENTS

4.01 Furnish and install, where shown on the drawings, the following devices

A. Manual Fire Alarm Stations

Manual Fire Alarm Stations shall be non-coded, break glass, single or double action type, with a key operated test-reset lock in order that they may be tested, and so designed that after actual emergency operation, they cannot be restored to normal except by use of a key. The reset key shall be so designed that it will reset manual station and open FACP without use of another key.

An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of fifty feet, front or side. Manual stations shall be constructed of LEXAN® with clearly visible operating instructions on the front of the stations in raised letters.

Stations shall be suitable for surface mounting on matching backbox, or semi-flush mounting on a standard single-gang box, and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) dependent on manual station accessibility or per local requirements. Manual stations shall be Model IDP-Pull. If using conventional pull stations they must be installed in conjunction with an Addressable Input Module or Mini Input Module. Manual stations shall be Silent Knight Model PS-DATK, PS-SATK, PS-DA or PS-SA and Underwriters Laboratories listed when used with addressable modules.

B. Remote Power Supplies

The Remote Power Supplies for Notification appliances shall be Intelligent and the same manufacturer as the FACP. The Intelligent Power Supplies shall reside on the main S-Bus and be programmed. Power supplies shall provide a minimum of 6 amps of 24 volt DC power with 4 notification circuits rated at 3 amps each. The power supply will shalle regenerate the S-Bus for an additional 6000’.

C. Notification Devices

The visual and audio/visual signaling devices shall be compatible with the FACP and be Listed with Underwriters Laboratories Inc. per UL 1971 and/or 1638. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder but will not interfere with the proper operation of any circuit which does not have a fault condition. The notification appliance (combination audio/visual units only) shall produce a peak sound output of 90dba or greater as measured in an anechoic chamber. The appliance shall be capable of meeting the candela requirements of the blueprints presented by the Engineer and ADA. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 19-30 volts

D. Smoke Detectors

Smoke detectors shall be compatible with the FACP, see type on and location on the design drawings. The combination detector head and twist lock base shall be U.L.

listed compatible with the FACP. The base shall permit direct interchange with other compatible detectors. The smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The sensitivity of the detector shall be capable of being selected and measured by the control panel without the need for external test equipment. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required. It shall be possible to perform a sensitivity test of the detector without the need of generating smoke. The test method shall simulate the effects of products of combustion in the chamber to ensure testing of the detector circuits. Detectors shall have completely closed back to restrict entry of dust and air turbulence and have a 30-mesh insect screen. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

PART 5 - WIRING

5.01 Installer's Responsibilities

A. The installer shall coordinate the installation of the fire alarm equipment.

B. All conductors and wiring shall be installed according to the manufacturer's recommendations.

C. It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.

5.02 Installation of System Components

A. System components shall be installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ).

B. All wire used on the fire alarm system shall be U.L. Listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.

PART 6 - WARRANTY AND FINAL TEST

6.01 General

A. Contractor shall provide two (2) years of installation warranty commencing on record date of the Notice of Completion (N.O.C) in addition to the manufacturer's standard product warranty.

B. All fire alarm work provided under this contract shall be tested in presence of project inspector (I.O.R) and local Fire Authority having Jurisdiction prior to occupancy.

C. Contractor shall review all work provided under this contract with the designated College Representative prior to expiration of warranty as a condition to end warranty period.

D. Contractor shall submit all materials and products intended to be used on this project as part of their shop drawing submittals for approval prior to use at site. No exceptions will be made for non –compliance of this requirements.

E. Contractor shall provide training for the College's Maintenance & Operations staff and informal commissioning of the systems prior to final acceptance by the College. M & O staff designated by the College shall sign off this requirement prior to project closeout. This may involve multiple site visits by contactor to meet these requirements.

F. Contractor shall provide a review and written report of all equipment performance and submission of finding to the College prior to expiration of product warranty. Any deficiencies noted or found prior to expiration of warranty period shall be corrected or replaced to the satisfaction of the College.

G. Contractor shall provide a review on site and re-training for M & O department prior to end of the warranty period.

6.02 Final Test

A. Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows:

B. The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.

C. At least one half of all tests shall be performed on battery standby power.

D. Where application of heat would destroy any detector, it may be manually activated.

E. The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.

F. When the testing has been completed to the satisfaction of both the contractor's job foreman and owner, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.

G. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

H. Prior to final test the fire department must be notified in accordance with local requirements.

6.03 As Built Drawings, Testing, and Maintenance Instructions

A. As Built Drawings

A complete set of reproducible “as-built” drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.

B. Operating and Instruction Manuals

Operating and instruction manuals shall be submitted prior to testing of the system. Three (3) complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with U.L. Standard 864.

6.04 PROTECTION

Protect the Work of this section until Substantial Completion.

6.05 CLEANUP

Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART I – GENERAL

1.1 RELATED DOCUMENTS

A. SUMMARY

1. Removal of vegetation, grass, grass roots, shrubs, tree stumps, trees, upturned stumps, weed growth, tree roots, brush, masonry, concrete, rubbish, debris and other materials.
2. Removal of concrete and bituminous surfaces.
3. Removal of existing fences and gates.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 2200 - Grading.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2319 - Excavation and Fill for Structures.
6. Section 31 2323 - Excavation and Fill for Utilities.
7. Section 31 2326 - Base Course.
8. Section 32 9000 - Planting.

1.2 SUBMITTALS

A. Shop Drawings: Submit site plan indicating extent of site clearing.

1.3 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition, as a minimum requirement.

PART II – PRODUCTS – NOT – USED

PART III – EXECUTION

3.1 TREE AND STUMP REMOVAL

A. Remove tress and stumps indicated or required to be removed. Remove trees, together with bulk of roots, to a minimum depth of 4 feet below required grade, and within a radius of approximately 7 feet beyond perimeter of trunk at grade.

B. Fill and compact excavation from tree and stump removal. Fill in 6 inch layers, each compacted to 90 percent of maximum density in accordance with ASTM

D1557.

1. Back filling shall not commence until the excavation is inspected and tested.

3.2 CONCRETE AND BITUMINOUS SURFACING REMOVAL

A. Break up and completely remove existing concrete surfacing, curbs, gutters, walks and bituminous surfacing to indicate limits. Cutting shall be performed to a neat and even line with proper tools or a concrete cutting saw. Minimum depth of cut hall be 1 1/2-inch, unless otherwise indicated. Remove concrete broken beyond the indicated limits to the nearest joint or score line and replace with new concrete to match existing.

3.3 FENCING

A. Existing fences scheduled to remain may be removed to facilitate the Work, provided they are installed to their original condition in accordance with requirements of Section 32 3113 - Chain Link Fences and Gates.

B. Fencing indicated to be removed and not reinstalled shall be completely removed, including footings. Fill and compact excavations.

C. Install chain link fencing indicated to be relocated or reset in accordance with applicable requirements specified under Section 32 3113 - Chain Link Fences and Gates.

3.4 CLEANUP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 31 22 00

GRADING

PART I – GENERAL

1.1 SUMMARY

A. Section Includes:

1. General exterior grading, cutting and filling, including grading for building area, paving, planting areas, banks and hillsides.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2319 - Excavation and Fill for Structures.
6. Section 31 2323 - Excavation and Fill for Utilities.
7. Section 31 2326 - Base Course.
8. Section 32 9000 - Planting.

1.2 PROJECT REQUIREMENTS

A. General:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.
4. Before grading, contact Underground Service Alert of Southern California (USASC) for information on public buried utilities and pipelines. Retain the services of an underground utility locator for on-site utilities.

PART II – PRODUCTS

2.1 MATERIALS

A. Materials shall conform to requirements specified in this and related sections.

PART III – EXECUTION

3.1 PREPARATION

A. Protect and maintain installed stakes until their removal is required for the Work. Provide replacement grade or location stakes lost or disturbed.

B. Install grade stakes and compare to indicated grades. If discrepancies are found between existing grades and grades indicated on Drawings, do not proceed until discrepancies are resolved.

3.2 ROUGH AND FINE GRADING

A. Rough grade area sufficiently high to require cutting by fine grading:

1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement.
2. Slope banks to required finish grades as cut progresses or leave cuts full and finish grade by mechanical equipment to provide grades and soil densities indicated on the Drawings.
3. Grade Only Areas: In areas not indicated to receive pavement, rough grade to approximate finish grades and then scarify, moisten and roll to obtain required density and indicated finish grades.
4. Tolerances: Finish grades shall be within a tolerance of 0.05 inch per foot above or below grades indicated. Provide an average grade as indicated.

B. Base or Subgrade:

1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement:
    a. After scarifying, process loosened material to a finely divided condition and adjust moisture content to optimum condition by addition of water, addition and blending of dry suitable material, or by drying of existing material.
    b. Subgrade material shall be compacted by tamping, sheepsfoot rollers or pneumatic tire rollers. Required relative compaction shall be 90 percent minimum for the top 8 inches below subgrade.
    c. Install base course in accordance with Section 31 2326 - Base Course.
2. Tolerance of completed grades of base or subgrade shall not vary more than 0.03 inch per foot from grades indicated. Provide an average grade as indicated.

3.3 SHORING

A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.

B. Design and Calculations: Provide in accordance with requirement CalOHSA.

C. Remove shoring upon completion of the Work of this section or when no longer needed unless required otherwise by authorities having jurisdiction.

3.4 EXCESS MATERIAL DISPOSAL

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.5 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 31 23 13

EXCAVATION AND FILL

PART I – GENERAL

1.1 SUMMARY

A. Section includes:

1. Excavating, filling, backfilling, and compacting for Project site pavement, planting areas, buildings, and other structures.
2. Trenches for utility lines such as water, gas, irrigation, storm drain and sewer lines, concrete-encased conduits, manholes, vaults, valve boxes, catch basins, underground tanks, thrust blocks, yard boxes, pull boxes, and other utility appurtenances.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 01 4524 - Environmental Import/Export Materials Testing.
3. Section 31 1000 - Site Clearing.
4. Section 31 2200 - Grading.
5. Section 31 2326 - Base Course.
6. Section 32 0117 - Pavement Repair.
7. Section 32 1313 - Site Concrete Work.
8. Section 32 3113 - Chain Link Fences and Gates.
9. Section 32 8413 - Potable Water Irrigation.
10. Section 32 9000 - Planting.
11. Section 33 1100 - Site Water Distribution Utilities.
12. Section 33 3000 - Site Sanitary Sewer Utilities.
13. Section 33 4000 - Storm Drainage Utilities.
14. Division 22 - Plumbing.
15. Division 26 - Electrical.

1.2 PROJECT REQUIREMENTS

A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

1.3 SUBMITTALS

A. Shoring calculations as required in Article 3.03 of this Section.

1.4 QUALITY ASSURANCE

A. Comply with the Standard Specifications for Public Works Construction, current edition, except as modified herein.

B. Sampling, testing, and certification of imported and exported soils shall be performed in accordance with Section 01 4524, Environmental Import/Export Materials Testing.

1.5 TESTING

A. OWNER will retain a Geotechnical Engineer as an OWNER Consultant who will provide observations, tests, inspections and approvals identified in the Contract Documents as being responsibility of OWNER.

B. Imported Soils: The Geotechnical Engineer will obtain initial product Sample for testing in accordance Article 3.05 of this Section.

1.6 PROJECT CONDITIONS

A. OWNER will retain a Geotechnical Engineer as an OWNER Consultant who will provide observations, tests, inspections and approvals identified in the Contract Documents as being responsibility of OWNER.

PART II – PRODUCTS

2.1 FILL AND BACKFILLS MATERIALS

A. Fill and backfill material shall be a granular material previously removed from excavation or imported fill material, free of clods and stones larger than 3 inches, (2½ inches for utility trenches) foreign materials, vegetable growths, sod, expansive soils, rubbish and debris. Material shall conform to these specified requirements and related sections.

B. Fill material exhibiting a wide variation in consistency and moisture content shall be blended and aerated to stabilize and upgrade the material.

C. Bedding material from trench bottom to one foot above the pipe:

1. Sand, gravel, crushed aggregate or native free-draining granular material providing a sand equivalent of at least 30 or a coefficient of permeability greater than 1.4 inches per hour.
2. Sand complying with the Specifications for cement concrete aggregates.

D. Brick rubble and broken concrete originating from the Project site shall be legally disposed of off the Project site No such material shall be imported from outside the Project site.

E. Permeable Backfill:

1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations.

Sieve Size:	Percentage Passing:
3/4 inch (19mm)	100
3/8 inch (10mm)	80 to 100
No. 100	0 to 8
No. 200	0 to 3

2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.
3. Provided backing for weep-holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.
4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system Miradrain by Mirafi Inc., American Wick Drain, JDR Enterprises, or equal, may be provided if reviewed and approved by the ARCHITECT.

F. Cement-sand slurry shall be provided with one sack of cement per cubic yard of the mixture.

2.2 BASE MATERIALS

A. Concrete Slabs on Grade: Provide "Crushed Aggregate Base" as specified in Standard Specifications for Public Works Construction, Section 200 - Rock Materials, with 3/4 inch maximum size aggregates. Provide 3 inch thick base, unless noted otherwise.

B. Bituminous Surfacing: Provide as indicated on Drawings and specified in Section 31 2326 Base Course.

PART III – EXECUTION

3.1 GENERAL

A. Before initiating intrusive activities, contact Underground Service Alert of Southern California (USA or Dig Alert) to obtain a Dig Alert ticket for location information on buried public and USA member utilities and pipelines at least 48-

hours prior to beginning work. A copy of the Dig Alert ticket shall be forwarded to the OWNER. For on-site utilities, retain a state-licensed third party underground utility locating service.

B. Where the Work includes a building extension or addition on an occupied Project site, perform Work in such a manner, and at such times, as not to disrupt performance of existing utility services to existing Project site facilities. Where an interruption is necessary, obtain review from the OAR before proceeding.

C. Remove concrete or bituminous pavement to straight lines by saw cutting.

3.2 PROTECTION

A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, OSHA regulations.

B. The existing improvements including landscaping against damage. Repair or replace damaged items.

C. Protect existing utility services and distribution systems from damage or displacement.

D. Remove conduits or pipes not in service, exposed during Work, unless a minimum cover of two feet is provided. Remove concrete, clay or other non-metallic pipe over 8 inches in diameter, unless otherwise indicated.

E. Shore, crib, or lag excavations and earthen banks as necessary to prevent cave in, erosion or gullying of sides.

F. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. If soil becomes soft, soggy, or saturated, excavate to firm undisturbed earth and fill as required. Slope adjacent grades away from excavations to minimize entry of water.

3.3 SHORING

A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.

B. Design and Calculations: Provide in accordance with requirement of governing Cal-OSHA requirements.

C. Protect existing utility services and distribution systems from damage or displacement.

3.4 EXCAVATION

A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork", except as modified herein.

B. Form sides of footings, pads, grade beams, and slab foundations, unless otherwise indicated. Provide excavations of sufficient size to permit installation and removal of forms and other required Work.

C. Machine-drill excavation for round footings to size and depth indicated. Provide a collar or casing, or other adequate protection, to exclude dirt and debris. Protect excavations with plank covers until concrete is placed.

D. Provide excavation bottoms level and free from loose material. Excavate to indicated or required elevations of undisturbed earth.

E. Barricade trenches, ditches, pits, sumps, and similar Work outside the barricaded working area with chain link fence as specified in Section 01 5000 - Construction Facilities and Temporary Controls, and in accord with Cal-OSHA standards and requirements.

F. Trenches over five feet in depth shall comply with the Construction Safety Orders of California Division of Industrial Safety.

G. Where indicated or required to excavate in lawn areas, protect adjoining lawn areas outside of the Work area. Replace or install removed sod upon completion of backfill by installing sod level with adjacent lawns. If installation of removed sod fails, furnish sod and install to match existing lawns.

H. For Structures:

1. Calculate excavation quantities based on elevations or depths indicated on Drawings.
2. Provide 2,000 psi concrete for backfill of over-excavated areas to indicated or required elevations.
3. Special preparation of bottom of excavated planes areas: Excavate areas shown on Drawings as bottom of excavated planes (B.E.P.), by excavating and filling to indicated grades and elevations.

I. For Utilities:

1. Excavate trenches to required depth for utility lines, such as pipes, conduits, and tanks, with minimum allowance of 6 inches at the bottom and 6 inches at the sides for bedding or concrete encasement as indicated on Drawings. Grade bottom of trenches to a uniform smooth surface. Remove loose soil from the excavation before placing sand bedding or concrete encasement.
2. Do not install piping lengthwise under concrete walks without review by the ARCHITECT.
3. Do not excavate trenches parallel to footings closer than 18 inches from the face of the footing or below a plane having a downward slope of two horizontal to one vertical, from a line 9 inches above bottom of footings.

a. Unless otherwise indicated on Drawings, depth of excavations outside buildings shall provide for a minimum coverage above top of piping, tank or conduit measured from the lowest adjoining finished grade, as follows:

Steel Pipe	24 inches below finish grade
Copper Water Tube	18 inches below finish grade
Cast-Iron, Pressure Pipe	36 inches below finished grade
Plastic Pipe (other than waste)	30 inches below finished grade
Tanks or other structure	36 inches below finished grade
Soil, sewer and storm drain	minimum 18 inches below finished grade, and as required for proper pitch and traffic load. Install polypropylene sewer pipe with at least 24 inches of coverage.
Irrigation Pipe:	Non-pressure pipe - 12 inches, pressure pipe - 24 inches.

b. Trench width shall provide space for fitting and joining. Excavate for piping bells and fittings, bell and spigot pipe and other fittings.

4. Where portions of existing structures, walks, paving, or other improvements are removed or cut for piping or conduit installation, replace the material with equal quality, finished to match adjoining existing improvements. Repair pavement as specified in Section 32 0117 - Pavement Repair.
5. Provide a minimum clear dimension of 2 inches from sides of wall excavation to outer surfaces of buried pipes or conduits placed in the same trench or outside surfaces of containers and tanks.

3.5 IMPORT/EXPORT OF MATERIALS

A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork", except as modified herein. Install and compact fill in layers not to exceed 6 inches in thickness.

B. Provide fill materials as specified in Part 2- Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.

C. In addition to the requirements of this Section, import/or exported materials shall comply with the requirements of Section 01 4524, Environmental Import/Export Material Testing.

D. Imported fill materials shall be sampled by the Geotechnical Engineer, for compliance with the requirements of Part 2 of this Section.

E. The Geotechnical Engineer, will submit the samples to an independent DSA approved testing laboratory for testing.

F. Initial sampling and testing shall be performed before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and entity responsible for the source site. The Geotechnical Engineer, will obtain both the initial and additional samples from the identified site and submit samples for required testing.

G. The Geotechnical Engineer will perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.

H. The independent approved testing laboratory will perform the required tests and report results of tests noting if the tested material passed or failed such tests and will furnish copies to the Project Inspector, ARCHITECT, OAR, DSA, CONTRACTOR, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, California Building Code, and the DSA. Upon completion of the Work of this Section, the independent testing laboratory and Geotechnical Engineer will submit a verified report to the DSA as required by the CBC.

I. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.

J. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.6 INSTALLATION OF MATERIALS

A. Pavement: Fill or backfill materials shall be installed in horizontal layers of 6 inches, unless otherwise required. Each layer shall be evenly placed and moistened or aerated as necessary. Unless otherwise reviewed by the Geotechnical Engineer, each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is installed. Top surface of each layer shall be installed to an approximate level with a crown or crossfall of at least 1 in 50, but not more than 1 in 20. Provide adequate drainage at all times during installation of the Work of this Section.

B. Structures:

1. After concrete has been placed, forms removed, and concrete Work inspected, backfill excavations with earth to indicated or required grades.

Backfill simultaneously on each side of walls or grade beams. Remove rubbish, debris and other waste materials from excavations before placing backfill.

2. Before placing backfill, adequately cure concrete and provide bracing, if required to stabilize structure. Protect waterproofing or damp-proofing against damage during backfilling operations, with required protection board. Remove bracing as backfill operation progresses.
3. Do not furnish or install expansive soils for retaining wall backfill.
4. Rigidly control the amount of water to be installed to provide optimum moisture content for type of fill material furnished. Do not over-saturate or compact by flooding or jetting.
5. Install wall backfill before installing railings and fences on walls.
6. Install weep hole drainage at the backside of walls so the backing completely covers the weep holes, is horizontally centered and extends at least 12 inches above the bottom of the weep opening. Provide an 8-inch square section of 1/4 inch galvanized or aluminum screen, with a minimum wire diameter of 0.03 inch, and install at the backside of each weep hole before installing the backfill material.
7. Where a reviewed drainage matting system is provided instead of permeable backfill for retaining structures, install in accordance with the manufacturer recommendations.

C. Utilities:

1. Do not install backfill until the Work of this Section has been inspected and tested. Do not furnish or install materials excavated from the Project site containing materials not permitted for backfill.
2. Backfill electrical or other excavated utility trenches located outside of barricaded installation areas within 24 hours after inspection by the IOR.
3. Install backfill in layers not exceeding 4 inches in thickness, except cement-sand slurry.
4. If materials excavated from the Project site are not permitted for trench backfill in paved areas, backfill trenches with a cement-sand slurry mix. Install backfill to an elevation of the existing undisturbed grades plus one inch.

3.7 COMPACTING

A. Each layer of fill material shall be compacted by tamping, sheepsfoot rollers, or pneumatic-tired rollers to provide specified relative compaction. At inaccessible locations, provide specified compaction by manually held, operated and directed compaction equipment.

B. Install and compact sand bedding to provide a uniform bearing under the full length of piping and conduits.

C. Unless otherwise indicated, compact each layer of fill material to a relative compaction of at least ninety percent.

D. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each layer of compacted fill before installing the next succeeding layer.

3.8 INSPECTION AND TESTING

A. The Geotechnical Engineer will inspect and test excavations, sample material quality for testing as set required in Part 2, and observe installation and compaction of fill materials.

B. The Geotechnical Engineer will sample imported fill materials from their designated source and submit samples to the independent approved testing laboratory before delivery to the Project site.

C. Installation of backfill shall be observed by the Geotechnical Engineer.

D. The Geotechnical Engineer will inspect and test excavation Work before the installation of fill and other materials.

E. Compaction: Test compaction in accordance with ASTM D1557, Method C.

F. The Project Inspector will inspect foundation excavations when completed and ready for forms, after forms are in place, and before first placement of concrete.

3.9 PROTECTION

A. Protect the Work of this Section until Substantial Completion.

3.10 CLEANING

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 31 23 16

EXCAVATION AND FILL FOR PAVING

PART I – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating, backfill, and compacting for paved areas.
2. Installation of fill materials.

B. Section includes:

1. Excavating, backfill, and compacting for paved areas.
2. Section 01 4524 - Environmental Import/Export Materials Testing.
3. Section 31 1000 - Site Clearing.
4. Section 31 2200 - Grading.
5. Section 31 2323 - Excavation and Fill for Utilities.
6. Section 32 2326 - Base Course.
7. Section 32 0117 - Pavement Repair.
8. Section 32 1216 - Asphalt Paving.
9. Section 32 1313 - Site Concrete Work.

1.2 PROJECT REQUIREMENTS

A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

1.3 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition, except as modified herein.

B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 01 4524 - Environmental Import/Export Materials Testing.

1.4 TESTING

A. OWNER will retain a Geotechnical Engineer as an OWNER Consultant who will provide observations, tests, inspections and approvals identified in the Contract

Documents as being responsibility of OWNER.

B. Imported Soils: The Geotechnical Engineer will obtain initial product Sample for testing in accordance Article 3.05 of this Section.

1.5 PROJECT CONDITIONS

A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

PART II - PRODUCTS

2.1 BASE MATERIALS

A. Concrete Slabs On Grade: Provide “Crushed Aggregate Base “as specified in the Standard Specifications for Public Works Construction, Section 200: “Rock Materials,” with ¾ inch maximum size aggregates. Provide 3-inch thick base, unless noted otherwise.

B. Bituminous Surfacing: As indicated on Drawings and specified in Section 31 2326 - Base Course.

2.2 FILL AND BACKFILL MATERIALS

A. Fill and backfill materials shall be previously excavated materials or imported fill material, free of clods and stones larger than 3-inch, foreign materials, vegetable growths, sod, expansive soils, rubbish and debris. Material shall conform to these specified requirements and related sections.

B. Fill material exhibiting a wide variation in consistency and moisture content shall be blended or aerated to stabilize and upgrade the material.

C. Imported Fill Material:

1. Provide suitable materials obtained from Project site excavations for earthwork and fill materials. If excavated materials are not of suitable quality or sufficient quantity, import additional materials as necessary.

2. Imported fill shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing 200 mesh sieve. Material shall have a coefficient of expansion of not more than 2 percent from air dry to optimum moisture content and not more than 6 percent from air dry to saturation. Imported material shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.

D. Brick rubble and broken concrete originating from the Project site shall be legally disposed of off the Project site. No such materials shall be imported from outside the Project site.

E. Permeable Backfill:

1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations:

Sieve Size:	Percentage Passing:
3/4 inch (19mm)	100
3/8 inch (10mm)	80 to 100
No. 100	0 to 8
No. 200	0 to 3

2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.
3. Provided backing for weep holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.
4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system, Miradrain by Mirafi Inc., or equal, may be provided if reviewed and approved by the ARCHITECT.

PART III – EXECUTION

3.1 GENERAL

A. Before initiating intrusive activities, contact Underground Service Alert of Southern California (USA or Dig Alert) to obtain a Dig Alert ticket for location information on buried public and USA member utilities and pipelines at least 48-hours prior to beginning work. A copy of the Dig Alert ticket shall be forwarded to the OWNER. For on-site utilities, retain a state-licensed third party underground utility locating service.

B. Clear the Project site as indicated in Section 31 1000 - Site Clearing.

3.2 PROTECTION

A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, Cal-OSHA regulations.

B. Protect adjacent existing improvements including landscaping against damage.

3.3 EXISTING UTILITY LINES

A. Protect existing utility lines from damage or displacement.

B. Remove conduits or pipes not in service, exposed during Work, unless a minimum cover of 2 feet is provided. Remove concrete, clay or other non-metallic pipe over 8 inches in diameter, unless otherwise indicated.

3.4 EXCAVATION

A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.

3.5 FILL

A. Unclassified Fill and Compaction: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.

B. Provide fill materials as specified in Part 2 - Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.

C. In addition to the requirements of this Section, import and/or exported materials shall comply with the requirements of Section 01 4524 - Environmental Import/Export Materials Testing.

D. Imported fill materials will be sampled by the Geotechnical Engineer for compliance with the requirements of Part 2 of this Section.

E. The Geotechnical Engineer will submit samples to a DSA approved independent approved testing laboratory for testing.

F. Initial sampling will be performed by the Geotechnical Engineer before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site. The Geotechnical Engineer will obtain both the initial and additional samples from the identified site and will submit samples to the approved independent testing laboratory for testing.

G. The Geotechnical Engineer will perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.

H. The independent approved testing laboratory will perform the required tests and report results of tests noting if the tested material passed or failed such tests and will furnish copies to the Project Inspector, ARCHITECT, OAR, DSA, CONTRACTOR, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC, and the DSA. Upon completion of the Work of this Section, the independent testing laboratory and Geotechnical Engineer shall submit a verified report to the DSA as required by CBC.

I. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.

J. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.6 INSTALLATION OF MATERIALS

A. Fill or backfill materials shall be installed in horizontal layers of 6 inches, unless otherwise required. Each layer shall be evenly placed and moistened or aerated as necessary. Unless otherwise reviewed by the Geotechnical Engineer, each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is installed. Top surface of each layer shall be installed to an approximate level with a crown or crossfall of at least 1 in 50, but no more than 1 in 20. Provide adequate drainage at all times during construction of the Work of this Section.

3.7 COMPACTING

A. Each layer of fill material shall be compacted by tamping, sheepsfoot rollers, or pneumatic-tired rollers to provide specified relative compaction. At inaccessible locations, provide specified compaction by manually held, operated and directed compaction equipment.

EDIT NOTE: EDIT THE FOLLOWING COMPACTION PERCENTAGE, TO REFLECT WITH RECOMMENDATIONS CONTAINED IN THE SOILS REPORT.

B. Unless otherwise indicated, compact each layer of earth fill to a relative compaction of at least 90 percent.

C. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each compacted layer before installing the next succeeding layer.

3.8 INSPECTION AND TESTING

A. The Geotechnical Engineer will inspect and test excavations, sample material quality as required in Part 2, and observe installation and compaction of fill materials.

B. The Geotechnical Engineer will sample imported fill materials from their designated source before delivery to the Project site.

C. Installation of backfill will be observed by the Geotechnical Engineer.

D. The Geotechnical Engineer will inspect and test excavation Work before the installation of fill and/or other materials.

E. Compaction: Test compaction in accordance with ASTM D1557, Method C.

3.9 PROTECTION

A. Protect the Work of this Section until Substantial Completion.

3.10 CLEANING

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 31 23 23

EXCAVATION AND FILL FOR UTILITIES

PART I - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating, backfilling, and compacting utility trenches such as water, gas, irrigation, storm drain, sewer lines, concrete-encased conduits, and manholes, vaults, valve boxes, catch basins, underground tanks, thrust blocks, yard boxes, pull boxes and other utility appurtenances.

B. Related Sections:

1. Division 01 - General Requirements.
2. Section 01 4524 - Environmental Import/Export Materials Testing.
3. Section 31 1000 - Site Clearing.
4. Section 31 2200 - Grading.
5. Section 31 2316 - Excavation and Fill for Paving.
6. Section 31 2319 - Excavation and Fill for Structures.
7. Section 32 0117 - Pavement Repair.
8. Section 32 1313 - Site Concrete Work.
9. Section 33 1100 - Site Water Distribution Utilities.
10. Section 33 4000 - Storm Drainage Utilities.
11. Division 22 - Plumbing.
12. Division 26 - Electrical.

1.2 PROJECT REQUIREMENTS

A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

1.3 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement: Standard Specifications for Public Works construction, current edition except as modified herein.

B. Sampling, testing, and certification of imported and/or exported soils shall be

performed in accordance with Section 01 4524 - Environmental Import/Export Materials Testing.

1.4 TESTING

A. OWNER will retain a Geotechnical Engineer as an OWNER Consultant who will provide observations, tests, inspections and approvals identified in the Contract Documents as being responsibility of OWNER.

B. Imported Soils: The Geotechnical Engineer will obtain initial product Sample for testing in accordance Article 3.02 of this Section.

1.5 PROJECT CONDITIONS

A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

PART II - PRODUCTS

2.1 MATERIALS

A. Bedding material from trench bottom to one foot above the pipe:

1. Sand, gravel, crushed aggregate or native free-draining granular material providing a sand equivalent of at least 30 or a coefficient of permeability greater than 1.4 inches per hour.
2. Sand complying with the Specifications for cement concrete aggregates.

B. Backfill Materials:

1. Excavated trench material to be installed for backfilling shall be clean, free of large clods, and stones larger than 2 ½-inch in any dimension.
2. Cement-sand slurry shall be provided with one sack of cement per cubic yard of the mixture.
3. Imported Fill Material: Imported fill material shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing a 200 mesh sieve. Material shall provide a coefficient of expansion of not more than two percent from air dry to optimum moisture content and not more than six percent from air dry to saturation. Imported materials shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.

PART III - EXECUTION

3.1 MATERIALS

A. Before initiating intrusive activities, contact Underground Service Alert of Southern California (USA or Dig Alert) to obtain a Dig Alert ticket for location information on buried public and USA member utilities and pipelines at least 48-hours prior to beginning work. A copy of the Dig Alert ticket shall be forwarded to the OWNER. For on-site utilities, retain a state-licensed third party underground utility locating service.

B. Barricade trenches, ditches, pits, sumps, and similar Work outside the barricaded working area with chain link fence as specified in Section 01 5000, Construction Facilities and Temporary Controls, and in accordance with Cal-OSHA standards and requirements.

C. Saw-cut concrete or bituminous paving for trench installation.

D. Trenches over 5 feet in depth shall conform to the Cal-OSHA.

E. Where indicated and required to excavate in lawn areas, protect adjoining lawn areas outside of the Work area. Replace or install removed sod upon completion of backfill by installing sod level with adjacent lawns. If installation of removed sod fails, furnish sod and install to match existing lawns.

F. Backfill over excavations to the required elevations with earth, gravel, sand, or concrete and compact as required. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. Slope adjacent grades away from excavations to minimize entry of water.

G. Do not install piping lengthwise under concrete walks without review by the ARCHITECT.

H. Do not excavate trenches parallel to footings closer than 18 inches from the face of the footing or below a plane having a downward slope of two horizontal to one vertical, from a line 9 inches above bottom of footings.

1. Unless otherwise indicated on Drawings, depth of excavations outside the buildings shall allow for a minimum coverage above top of pipe, tank, or conduit measured from the lowest adjoining finished grade, as follows:

Steel Pipe	24 inches below finished grade
Copper Water Tube	18 inches below finished grade
Cast-Iron Pressure Pipe	36 inches below finished grade
Plastic Pipe (other than waste)	30 inches below finished grade
Tanks or other structures	36 inches below finished grade
Soil, Sewer & Storm Drain	minimum 18 inches below finished grade, and as required for proper pitch and traffic load. (Install

	polypropylene sewer pipe with at least 24 inches coverage)
Irrigation Pipe:	nonpressure pipe 12 inches, pressure pipe 24 inches

2. Trench width shall provide ample space for fitting and joining. Excavate for piping bells and fittings, bell and spigot pipe and other fittings.

I. Unless indicated otherwise, excavate trenches to the required depths for utilities, such as pipes, conduit and tanks, with minimum allowances of 6 inches at the bottom and 6 inches at the sides for bedding of unprotected piping or as required for concrete encasement of conduits as indicated on Drawings. Grade bottom of trenches to a uniform smooth surface. Remove loose soil from the excavation before installing sand bedding or concrete encasement.

J. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. If soil becomes soft, soggy, or saturated, excavate to firm undisturbed soil and fill as required. Slope adjacent grades away from excavations to minimize entry of water.

K. Provide a minimum clear dimension of 2 inches from sides of wall excavation to outer surfaces of buried pipes or conduits installed in the same trench or outside surfaces of containers and tanks.

L. Do not install backfill until required inspections and testing is completed.

M. Backfill electrical or other excavated utility trenches located outside of barricaded installation areas within 24 hours after inspection by the Project Inspector.

N. Install backfill materials in layers not exceeding 4 inches in thickness and compact to 90 percent of the maximum density.

O. If materials excavated from the Project site are not permitted for trench backfill in paved areas, backfill trenches with a cement-sand slurry mix. Install backfill to an elevation of the existing undisturbed grade plus one inch.

P. Install and compact sand bedding to provide a uniform full length bearing under piping and conduits.

Q. Where portions of existing structures, walks, paving, or other improvements are removed or cut for piping or conduit installation, replace the material with equal quality, finished to match adjoining existing improvements. Repair pavement as specified in Section 32 0117, Pavement Repair.

3.2 IMPORT/EXPORT OF MATERIALS

A. Provide fill materials as specified in Part 2, Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.

B. In addition to the requirements of this Section, import and exported materials shall comply with the requirements of Section 01 4524, Environmental Import/Export Material Testing.

C. Imported fill materials will be sampled by the Geotechnical Engineer for compliance with the requirements of Part 2 of this Section.

D. The Geotechnical Engineer will perform the tests by utilizing an independent approved testing laboratory.

E. Initial sampling will be performed by the Geotechnical Engineer before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site. The Geotechnical Engineer will obtain both the initial sample and additional samples from the identified site and shall submit all samples to the approved independent testing laboratory.

F. The Geotechnical Engineer will perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.

G. The independent approved testing laboratory will perform the required tests and report results of all tests noting if the tested material passed or failed such tests and will furnish copies to the Project Inspector, ARCHITECT, OAR, DSA, CONTRACTOR, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC and the DSA. Upon completion of the Work of this Section, the independent testing laboratory and Geotechnical Engineer will submit a verified report to the DSA as required by CBC.

H. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.

I. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.3 INSPECTION AND TESTING

A. The Geotechnical Engineer will inspect and test excavations, sample material quality as required in Part 2, observe installation and compaction of fill materials.

B. Compaction test shall be performed in accordance with ASTM D1557, method "C."

3.4 PROTECTION

A. Protect the Work of this Section until Substantial Completion.

3.5 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 31 23 26

BASE COURSE

PART I – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Installation of base material.

B. Related Sections:

1. Division 01 - General Requirements.
2. Section 01 4524 – Environmental Import / Export Material Testing.
3. Section 31 1000 - Site Clearing.
4. Section 31 2200 - Grading.
5. Section 31 2313 - Excavation and Fill.
6. Section 31 2316 - Excavation and Fill for Paving.
7. Section 32 0117 - Pavement Repair.
8. Section 32 1216 - Asphalt Paving.
9. Section 32 1313 - Site Concrete Work.

1.2 SUBMITTALS

A. Crushed aggregate base (CAB) shall consist of native rock without naturally occurring asbestos or recycled materials. The CONTRACTOR shall submit written documentation, which identifies the source, volume, and proposed transport date of the material for review and approval by OWNER'S Office of Environmental Health and Safety (OEHS) prior to importing the material. A statement on company letterhead from the CAB source, stamped by either a California Professional Geologist or Engineer, which states that the subject materials are native rock, do not contain any recycled materials and that the source quarry does not mine ultramafic materials, a source of natural occurring asbestos shall be included in the submittal to OEHS. The CONTRACTOR may request variance from analytical testing required by Section 01 4524 for CAB. To be considered for a variance, the CONTRACTOR shall submit a documentation package for OEHS approval, which includes all of the aforementioned information at least 48 hours in advance of planned import.

1. Frequently used suppliers for LAUSD projects include:
    a. Hansen Aggregates.
    b. Vulcan Materials, Reliance Company.
    c. Vulcan Materials Durbin.

B. Product Data: Submit material source, technical information and test data for base materials. Gradation and quality certifications shall be dated within 30 days of the submittal.

C. Sample: Submit sample of proposed base course material.

1.3 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

PART II – PRODUCTS

2.1 MATERIALS

A. Crushed Aggregate Base (CAB) materials shall conform to the requirements of the Standard Specifications for Public Works Construction: Section 200 - Rock Materials.

B. Crushed Miscellaneous Base (CMB) or materials generated on site shall not be used as a base course material.

2.2 MATERIAL APPROVAL

A. Base material shall be inspected by the Project Inspector for gradation and material content prior to installation. The OWNER may choose to have additional tests performed by a geotechnical engineer, retained by the OWNER, before installation.

PART III – EXECUTION

3.1 INSTALLATION

A. Install base course material in layers not exceeding 4 inches in thickness, unless required otherwise. Grade and compact to indicated levels or grades, cut and fill, water and roll until the surface is hard and true to line, grade and required section. Provide a relative compaction of at least 95 percent, unless otherwise required.

B. Crushed Grade base course to elevations indicated on Drawings, ready to receive surfacing, in accordance with Section 31 2200 - Grading.

3.2 PROTECTION

A. Base Protect the Work of this section until Substantial Completion.

3.3 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART I – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation for the following:
    a. Engineered stress-relieving paving mat fabric.
    b. Asphalt (bituminous) surfacing.
        1) Single course bituminous paving.
        2) Double course bituminous paving.
    c. Seal coat for asphalt surfacing.

B. Related Sections:

1. Division 01 – General Requirements.
2. Section 31 22 00 - Grading.
3. Section 31 23 13 - Excavation and Fill.
4. Section 31 23 16 - Excavation and Fill for Paving.
5. Section 31 23 23 - Excavation and Fill for Utilities.
6. Section 31 23 26 - Base Course.
7. Section 32 13 13 - Site Concrete Work.
8. Section 32 12 36 - Seal for Bituminous Surfacing.

1.2 REFERENCES

A. ASTM International (ASTM):

1. ASTM D 276 – Standard Test Methods for Identification of Fibers in Textiles
2. ASTM D 946 – Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
3. ASTM D 1188 – Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples.
4. ASTM D 5035 – Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method).
5. ASTM D 6140 – Standard Test Method to Determine Asphalt Retention of Paving Fabrics Used in Asphalt Paving for Full-Width Applications
6. ASTM D 6241 – Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

B. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO Standard Specifications for Highway Materials and Methods of Sampling and Testing.

C. The Asphalt Institute (AI):

1. AI MS-2 – Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; current edition.
2. AI MS-19 – A Basic Asphalt Emulsion Manual; current edition.

D. Public Works Standards, Inc.:

1. Standard Specifications for Public Works Construction (SSPWC):
    a. The "Greenbook"; current edition.

1.3 QUALITY ASSURANCE

A. Comply with SSPWC as minimum requirement asphalt (bituminous) surfacing materials and installation.

B. Pre-Construction Conference: Prior to installation of engineered paving mat, arrange meeting at Project Site with manufacturer’s representative and paving mat installer.

1.4 SUBMITTALS

A. Product Data:

1. Base Materials:
    a. Refer to base course materials specified in Section 31 23 26.
2. Herbicide Treatment:
    a. Manufacturer’s technical data for products proposed for use.
    b. Certificate indicating compliance with EPA requirements.
3. Bituminous Materials:
    a. Manufacturer’s technical data for materials and products
    b. Site plan indicating extent of paving and accessories.
4. Engineered Stress-Relieving Paving Mat Fabric:
    a. Manufacturer's product information and installation procedures for engineered stress-relieving paving mat fabric
5. Seal Coat:
    a. Manufacturer's product information and application procedures for seal coating.

B. Manufacturer's product information and application procedures for seal coating.

1. Furnish licensed weighmaster certificates with each load of asphalt (bituminous) surfacing delivered to Project.
2. Deliver certificates to Owner's representative, who will collect certificates and ensure that material represented by each certificate is actually incorporated in Work.

a. 24 pounds per square foot of paving area based on 2 inch thickness after rolling.
b. 5 percent tolerance will be allowed between total calculated weight and actual weight incorporated in Work.

3. Deliver certificates to Owner's representative, who will collect certificates and ensure that material represented by each certificate is actually incorporated in Work.

1.5 PROJECT CONDITIONS

A. Information on Drawings does not constitute guarantee of accuracy or uniformity of soil conditions over Project Site.

B. Grade Control:

1. Establish and maintain required lines and elevations.

C. Field Conditions for Asphalt (Bituminous) Surfacing Placement:

1. Place bitumen mixture when temperature is not more than 15 degrees F below bitumen supplier's bill of lading and not more than maximum specified temperature.

2. Do not place asphalt (bituminous) surfacing when atmospheric temperature is below 40 degrees F, or during unsuitable weather.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Sealer Material:

1. Agitate bulk materials during transport.

B. Store engineered paving mat per manufacturer's recommendations in dry covered condition free from dust, dirt, and moisture.

1.7 MAINTENANCE

A. Extra Material:

1. Furnish 10 gallons of sealer material in unopened containers.

PART II – PRODUCTS

2.1 MATERIALS

A. Headers and Stakes:

1. Headers:
   a. "Construction Heart" Grade redwood as graded by Redwood Inspection Service.
   b. Size: 2 x 6, unless otherwise indicated.
2. Stakes:

a. 2 x 4 redwood or 2 x 3 Douglas Fir, Construction Grade.

3. Nails:
   a. Common, galvanized, 12d minimum.

B. Herbicide Treatment:

1. Commercial chemical for weed control, registered by Environmental Protection Agency (EPA).
2. Provide granular, liquid, or wettable powder form.
3. Manufacturers:
   a. Subject to compliance with specified requirements, provide products of one of following:
      1) Bayer
      2) Dow AgroSciences
      3) E.I. Du Pont du Nemours and Company
      4) FMC Corporation
      5) Monsanto Company
      6) U.S. Borax & Chemical Corporation.

C. Engineered Stress-Relieving Paving Mat Fabric.

1. Engineered paving mat within pavement structure as shown on Drawings or directed by Project Inspector.
   a. Mat provides moisture barrier/stress relieving membrane and when placed beneath hot-mix asphalt overlay.
2. Provide engineered paving mat material meeting following physical properties:

PHYSICAL PROPERTIES OF FIBERGLASS POLYESTER PAVING MAT			
Property	**Test Method**	**Units**	**MARV***
Asphalt Retention	ASTM D 6140	l/m2 (gal./yd2)	0.47 (0.10)
Mass per unit area	ASTM D 5261	g/m2 (oz/yd2)	136 (4.0)
Tensile strength, MD	ASTM D 5035	kN/m (lb/in)	25 min (140)
Tensile Strength, CD	ASTM D 5035	kN/m (lb/in)	25 min (140)
CBR Puncture**	ASTM D 6241	N	1112 (250)
Elongation at maximum load, MD	ASTM D 5035	percent	<5
Elongation at maximum load, CD	ASTM D 5035	percent	<5
Melting point	ASTM D 276	C (F)	>230 (>446)
* MARV = Minimum Average Roll Value ** Assess 360 degree tensile strength symmetry			

3. Product and Manufacturer: GlasPave Paving Mat 25 as manufactured by Tensar International Corporation, Alpharetta, GA, or approved

equal.

D. Base Course:

1. Refer to Section 31 23 26.

E. Miscellaneous Materials:

1. Aggregate for Binder Course:
   a. In accordance with Caltrans specifications for Grade PG 64-10 Binder.
2. Aggregate for Wearing Course:
   a. In accordance with Caltrans or SSPWC specifications.
3. Fine Aggregate:
   a. In accordance with Caltrans or SSPWC specifications.
4. Mineral Filler:
   a. Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.
      1) Conforming to Caltrans or SSPWC specifications.
5. Primer:
   a. In accordance with SSPWC 203-2.4.
6. Tack Coat:
   a. In accordance with SSPWC specifications.

F. Bituminous Surface Course:

1. Vehicle Traffic:
   a. Provide materials of class, grade, or type indicated, conforming to SSPWC, Section 203-6.4 – Asphalt Concrete Mixtures.
      1) Class and Grade: C2-PG 64-10 per SSPWC Section 203-6.4.1

G. Seal Coat:

1. Provide seal coat materials conforming to SSPWC Section 203-9 by one of following or approved equal:
   a. Guard-Top, Division of Western Emulsions Inc.
   b. OverKote by Diversified Asphalt Products
   c. Park Top by Western Colloid Products

2.2 MIX DESIGNS FOR ASPHALT (BITUMINOUS) SURFACING

A. Design mixes conforming to Caltrans standards or SSPWC specifications.

B. Submit proposed mix design of each class of mix for review prior to beginning of Work.

2.3 SOURCE QUALITY CONTROL

A. Obtain materials from same source throughout Project.

B. Test mix design and samples in accordance with AI MS-2.

2.4 PERFORMANCE REQUIREMENTS

A. Design asphalt paving section and aggregate base course, as designated in Geotechnical Report.

PART III – EXECUTION

3.1 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 BASE COURSE INSTALLATION

A. Refer to Section 31 23 26

3.3 HEADERS

A. Install headers along edge of asphalt (bituminous) surfacing abutting turf, earth, or planting area, unless indicated otherwise.

B. Install headers so bottom surface has continuous bearing on solid grade.

1. Where excavation for headers is undercut, thoroughly tamp soil under header.
2. Compact backfill on both sides of header to density of adjacent undisturbed earth.

C. Fasten headers in place with redwood or Douglas fir stakes of length necessary to extend into solid earth a minimum of 12 inches. Stakes shall be of sound material, neatly pointed, driven vertically, and securely nailed to headers. Space stakes, not to exceed 4 feet on centers with top of stakes set one inch below top of header. Provide a minimum of two 12d galvanized common nails through each stake.

D. Remove existing headers where new surfacing is installed adjacent to existing surfacing.

E. Install temporary headers at transverse joints of paving where continuous paving operations are not maintained.

F. Provide additional stakes and devices as required to fasten headers.

3.4 PREPARATION

A. Primer: Apply primer in accordance with Greenbook Section 302-5.3.

B. Tack Coat:

1. Apply tack coat in accordance with Caltrans Specifications Section 39 and following:
    a. Apply tack coat to asphalt concrete base course or sand asphalt base course.
    b. Apply emulsified asphalt tack coat between each lift or layer of full depth asphalt concrete and sand asphalt bases and on surface of bases where asphalt paving will be constructed.
    c. Apply tack coat to surfaces of previously constructed asphalt concrete base courses or Portland cement concrete surfaces abutting or projecting into asphalt pavement.
2. Coat surfaces of curbs and gutters, and manhole, catch basin, and other structure frames with oil to prevent bond with asphalt pavement.
    a. Do not tack coat these surfaces.

3.5 ENGINEERED PAVING MAT INSTALLATION

A. Tack Coat:

1. Asphalt Binder for Application of Mat: PG 64–10.
2. Application Rates:
    a. New Pavement Surface: 0.15 gallons per square yard.
    b. Aged Oxidized Surface: 0.17 gallons per square yard.
    c. Milled Surface: 0.2 gallons per square yard.

B. Placement – General:

1. Examine surface on which the engineered paving mat is to be placed to ensure it is reasonably free of dirt, water, vegetation, or other debris.
2. Do not place asphalt binder (tack coat) or engineered paving mat when in judgment of Project Inspector weather conditions are not suitable.
3. Ensure air and pavement temperatures are sufficient to allow tack coat to hold engineered paving mat in place.
    a. Air Temperature:
        1) 50 degrees F and rising for placement of asphalt tack coat.

C. Application of Tack Coat:

1. By calibrated distributor truck spray bar.
    a. Emulsified asphalt is not allowed
2. Temperature of Tack Coat: Sufficiently high enough to permit uniform

spray pattern.
   a. Between 325 degrees F and 400 degrees F.
3. Target Width of Tack Coat Application:
   a. Engineered paving mat material width plus 4 inches.
   b. Wide enough to cover entire width of engineered paving mat material overlaps.
   c. Apply only as far in advance of engineered paving mat material installation as is appropriate to ensure tacky surface at time of engineered paving mat material placement.
   d. Do not allow pedestrian or vehicle traffic on tack coat.

D. Placement of Engineered Paving Mat:

1. Place engineered paving mat onto tack coat with minimum folds or wrinkles and before tack coat has cooled and lost tackiness.
2. Wrinkles or Folds in Excess of 1 inch: Slit and laid flat or pulled out and replaced as directed by Project Inspector.
3. In repaired areas, apply additional tack coat as needed to achieve sound bond to substrate.
4. Remove and replace damaged engineered paving mat per manufacturer's recommendations, at Contractor's expense with same type of material.
5. Use brooming, squeegee, or pneumatic tire rolling to remove air bubbles and to maximize engineered paving mat contact with pavement surface.
   a. Perform in accordance with manufacturer's specifications
6. Counter excess tack coat that bleeds through engineered paving mat under normal construction traffic by broadcasting clean sand or hot mix asphalt to create bond break between excess tack and construction equipment tires.
   a. Where sand is applied, remove excess sand from interlayer prior to placing hot mix asphalt overlay.
   b. Do not use other materials, such as asphalt release agents or diesel, for this purpose.
7. Do not allow traffic, except necessary construction traffic to be driven on engineered paving mat.
8. Closely follow placement of engineered paving mat with placement of first lift of hot mix asphalt overlay.
9. Pave areas in which engineered paving mat has been placed during same day.
10. In event of rainfall on engineered paving mat prior to placement of first hot mix asphalt overlay lift, allow engineered paving mat to dry before hot mix asphalt is placed.
11. Compacted thickness of first lift of hot mix asphalt overlay on engineered paving mat: Not less than 1.5 inches.
    a. Temperature of mix at placement not to exceed engineered paving mat melting point temperature.
    b. Where total hot mix asphalt overlay thickness is less than 1.5 inches, do not place engineered paving mat

3.6 MIXING OF ASPHALT (BITUMINOUS MATERIAL)

A. Mix uniformly, using dry material to avoid foaming.

3.7 CONSTRUCTION OF ASPHALT PAVING

A. Provide engineered paving mat and asphalt (bituminous) surfacing material over base course as specified and in accordance with manufacturer's installation procedures.

B. Clean, dry, and uniformly coat with asphalt emulsion film, surfaces of walls, concrete, masonry, or existing asphalt (bituminous) surfacing indicated to be in direct contact with installed asphalt (bituminous) surfacing.

C. Thicken edges of asphalt (bituminous) surfacing that do not abut walls, concrete, or masonry, and edges joining existing asphalt (bituminous) surfaces.

1. Remove headers at existing asphalt (bituminous) surfacing where new bituminous surfacing is to be installed.
2. Thicken edges an additional 2 inches and taper to the indicated or specified thickness 6 inches back from such edges.

D. Provide adequate protection for concrete, planting areas, and other finish Work adjacent to areas indicated to receive asphalt (bituminous) surfacing.

E. Stakes or Screeds: Provide grade or screed stakes spaced not more than 15 feet apart in flow lines with grades of less than one percent.

1. Continuous screeds may be provided instead of stakes

F. Placing – General:

1. Do not install asphalt (bituminous) surfacing when atmospheric temperature is below 40 degrees F or when fog or other unsuitable weather conditions are present.
    a. Temperature of Mixture at Time of Installation:
        1) Not lower than 260 degrees F in warm weather or higher than 320 degrees F in cold weather.
2. Where 2 inch or 3 inch thick asphalt (bituminous) surfacing is indicated or specified, install surfacing in one course.
3. Where asphalt (bituminous) surfacing is indicated or specified 4 inches or more in thickness, except for thickened edges, install asphalt (bituminous) surfacing in courses of approximately equal thickness, with each course not exceeding 2-1/2 inches in thickness unless otherwise required by Architect.

G. Placing Single Course Asphalt Pavement:

1. Install Work in accordance with Caltrans or SSPWC specifications.
2. Place asphalt within 24 hours of applying primer or tack coat.
3. Compact pavement by rolling to specified density.
    a. Do not displace or extrude pavement from position.
    b. Hand compact in areas inaccessible to rolling equipment.
4. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

H. Placing Double Course Asphalt Pavement:

1. Place asphalt binder course within 24 hours of applying primer or tack coat.
2. Place wearing course within two hours of placing and compacting binder course.
3. Compact pavement by rolling to specified density.
    a. Do not displace or extrude pavement from position.
    b. Hand compact in areas inaccessible to rolling equipment.
4. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

I. Spreading:

1. Install asphalt (bituminous) surfacing in manner to cause least possible handling of mixture
2. In open areas and wherever practicable:
    a. Install by mechanical means with self-propelled mechanical spreader.
3. In confined or restricted areas:
    a. Install mixture with hot shovels and rakes, and smooth with lutes.

J. Joints:

1. Provide vertical joints between successive runs.
    a. Install joints true to line, grade, and cross section.
    b. Lapped joints are not permitted.

K. Rolling:

1. Finish roll with self-propelled tandem roller weighing at least 8 tons.
    a. Break down roll with self-propelled roller weighing between 1-1/2 tons and 8 tons.
2. Roll in manner that preserves flow lines and established finished grades.
    a. Break down roll in areas adjacent to flow lines parallel to flow lines.
    b. Break down roll after bituminous surfacing is installed without shoving or cracking of mixture under roller.
    c. Continue finish rolling until surfacing is unyielding, true to grade, and meets requirements for specified smoothness.
    d. Areas inaccessible to finish roller may be finish rolled with breakdown roller or tamped with hot tamping irons and smoothed with hot smoothing irons or hand roller.
3. Where asphalt (bituminous) surfacing abuts concrete, masonry, and walks or paving, tamp joint smooth, when necessary, as described above to obtain uniformly even joint, true to line and grade.
    a. Tamp and smooth to properly compact.
4. Provide compacted asphalt (bituminous) surfacing with bulk specific gravity of at least 2.31 when tested in accordance with ASTM D 1188.

L. Pavement at Heavy Duty Asphalt Paving Areas:

1. Single course of 3 inch compacted thickness, sand seal coat.

3.8 TOLERANCES

A. Smoothness:

1. Ensure that surface of asphalt (bituminous) surfacing after rolling:
    a. Is even, smooth, and uniform in texture with no voids or rock pockets
    b. Free of roller marks, or other irregularities
    c. Not varying by more than 1/8 inch, except at local depressions or raised areas as indicated, when 10 foot straightedge is placed on surface.

B. Grade:

1. Finished Grade:
    a. Not vary more than 0.02 foot above or below required grade.
2. Compensate for variations within prescribed tolerance so that average grade and cross-section are provided.

3.9 FLOOD TESTING

A. Flood test completed asphalt (bituminous) surfacing in presence of Project Inspector before seal coat has been installed.
    1. Repair areas of standing water or puddles and flood test locally.

3.10 SEAL COAT

A. General:

1. Allow asphalt (bituminous) surfacing to cure for minimum of 30 days, then apply two coats of surface seal as specified
2. Where indicated, provide multiple coats of surface seal to existing asphalt (bituminous) surfacing.

B. Surface Preparation:

1. After asphalt (bituminous) surfacing has passed flood test, thoroughly wash surfaces with water to remove dirt, debris, excessive oil and grease, or other foreign matter and allow to dry before applying seal coat.
2. Apply seal coat after asphalt (bituminous) surfacing has passed flood test.

C. Application:

1. Install seal coat in strict accordance with manufacturer's written directions and recommendations.
2. Install 2 coats of seal coat to new asphalt (bituminous) surfacing.
3. Where new asphalt (bituminous) surfacing is installed adjacent to existing asphalt (bituminous) surfacing, overlap surface seal minimum of 12 inches onto existing asphalt (bituminous) surfacing.
4. Where existing asphalt (bituminous) surfacing is indicated to be patched and sealed.
5. Apply 2 coats of surface seal after patching.

3.11 FIELD QUALITY CONTROL

A. Additional Testing:

1. Owner reserves right to obtain samples and perform tests to ensure compliance with Specifications, and to review weight slips and invoices of materials delivered to Project Site.

B. Provide field inspection and testing.

1. Take samples and perform tests in accordance with AI MS-2.

3.12 CLEANING

A. Remove and legally dispose of rubbish, debris, and waste materials off Project Site.

3.13 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 7 days or until surface temperature is less than 140 degrees F.

1. Protect Work until Substantial Completion.

END OF SECTION

SECTION 32 01 17

ASPHALT PAVEMENT REPAIR

PART I – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bituminous Surfacing Repair: Areas removed for utility trenches, heaved by tree roots, cracked areas, protruding areas where pavement meets hard surfaces, depressed areas, holes and areas around new structures, and raveled bituminous pavement.
2. Areas heaved by tree roots, cracked areas, holes and trenches, and areas around new structures.

B. Related Sections:

1. Division 01 – General Requirements.
2. Section 31 2200 - Grading.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Paving.
5. Section 31 2319 - Excavation and Fill for Structures.
6. Section 31 2323 - Excavation and Fill for Utilities.
7. Section 31 2326 - Base Course.
8. Section 32 1216 - Asphalt Paving.
9. Section 32 1313 - Site Concrete Work.
10. Section 32 1236 - Seal for Bituminous Surfacing.

1.2 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating areas to be repaired.

B. Product Data: Submit manufacturer’s technical data for materials and products.

1.3 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition.

PART II – PRODUCTS

2.1 QUALITY ASSURANCE

A. Base course materials: Section 31 2326 - Base Course.

B. Asphalt paving materials: Section 32 1216 - Asphalt Paving.

C. Seal materials: Section 32 1236 - Seal for Bituminous Surfacing.

D. Headers: Section 32 1216 - Asphalt Paving.

2.2 BITUMINOUS MATERIALS

A. Provide materials and products of the class, grade or type indicated, conforming to relevant provisions of Section 203 - Bituminous Materials of the latest Standard Specifications for Public Works Construction.

PART III – EXECUTION

3.1 PAVEMENT REMOVAL

A. Remove bituminous and concrete pavement in accordance with applicable provisions of Section 300 - Earthwork of the Standard Specifications for Public Works Construction.

B. Pavement Heaved by Roots: Remove pavement to limits of distortion and expose roots. Trim roots to provide at least 12-inch clearance to pavement.

C. Remove protruding bituminous surfaces flush with the surrounding grade using a suitable tool or equipment so that adjacent finishes are not blackened.

D. Remove raveled and depressed bituminous pavement to limits indicated or required.

E. Saw cut existing improvements, trim holes and trenches in bituminous and concrete pavement to permit mechanical hand tampers to compact the fill.

F. Remove broken concrete by saw cutting. If the required cut line is within 30 inches of a score or joint line or edge, cut and remove to the score, joint line, or edge.

3.2 EXCAVATING, BACKFILLING AND COMPACTING

A. Confront to requirements in Section 31 2313 - Excavation and Fill; Section 31 2316 - Excavation and Fill for Paving; Section 31 2319 - Excavation and Fill for Structures; or Section 31 2323 - Excavation and Fill for Utilities, as required.

B. Where subgrade or base is deemed to be unstable or otherwise unsuitable, excavate such materials to firm earth, and replace with a required material. Install and compact fill materials in accordance with the requirements of related Specification sections.

3.3 HEADERS

A. Install headers along edge of bituminous surfacing abutting turf, earth, or planting area, unless indicated otherwise.

B. Install headers so the bottom surface has continuous bearing on solid grade.

Where excavation for headers is undercut, thoroughly tamp soil under the header. Compact backfill on both sides of header to the density of the adjacent undisturbed grade.

C. Fasten headers in place with redwood or Douglas fir stakes of length necessary to extend into solid earth a minimum of 12 inches. Stakes shall be of sound material, neatly pointed, driven vertically, and securely nailed to headers. Space stakes, not to exceed 4 feet on centers with top of stakes set one inch below top of header. Provide a minimum of two 12d galvanized common nails through each stake.

D. Remove existing headers where new surfacing is installed adjacent to existing surfacing.

E. Install temporary headers at transverse joints of paving where continuous paving operations are not maintained.

F. Provide additional stakes and devices as required to fasten headers.

3.4 BASE COURSE

A. Unless otherwise indicated, base course shall be crushed aggregate base, fine grade, 3 inches thick or equal to thickness of the existing base, whichever is greater.

B. Fill grade and compact as specified in Section 31 2200 - Grading.

3.5 RESURFACING

A. Holes Trenches: Remove loose dirt and backfill with cement-sand slurry allowing for surfacing one inch thicker than existing. Resurface flush with existing adjoining pavement installing the same type of materials and section provided in existing improvements.

B. Other Areas: Other surface improvements damaged or removed shall be cut to a neat even line and excavated one inch below the bottom of the existing pavement. Resurface by following the original grades and installing the same type of materials provided in existing improvements.

C. Where bituminous surfacing abuts concrete, masonry, walks or paving, tamp joint smooth, if necessary, as described above to obtain a uniformly even joint, true to line and grade. Tamp and smooth materials before asphalt cools.

3.6 REPAIRING AND RESEALING EXISTING SURFACES

A. Preparation of Surfaces: Prior to filling cracks, clean existing bituminous surfacing of loose and foreign materials and coat with a film of asphalt emulsion.

B. Repair of Existing Surfacing:

1. Fill cracks ½ inch wide and less with RS-1 emulsion and silica sand or

other required material. Cracks larger than ½ inch wide shall be filled with Type C2 Asphalt Concrete as specified. Cracks shall be filled to the level of adjacent surfacing

2. Where low areas, holes, or depressions occur in existing surfacing, repair with emulsified asphalt. Install material, strike off the emulsified asphalt with a straightedge flush with adjoining surfacing. Finish with a steel trowel, and after dehydration, compact by rolling or tamping.

C. Testing: Flood test entire area in presence of the Project Inspector. Entire area tested shall be free of standing water or puddles.

D. Surface Seal: After surface has been repaired and tested, install seal coat over entire area indicated. Surface seal shall be as specified in Section 32 1236 - Seal For Bituminous Surfacing.

3.7 CLEANING

A. Remove all stains on the Project site and adjacent properties caused by or attributed to the Work of this section.

B. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.8 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 32 12 36

SEAL FOR BITUMINOUS SURFACING

PART I – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface sealer over bituminous surfacing.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 32 0117 - Pavement Repair.
3. Section 32 1216 - Asphalt Paving.
4. Section 32 1723 - Pavement Marking.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product information and application procedures for bituminous surfacing.

1.3 QUALITY ASSURANCE

A. Comply with the Standard Specifications for Public Works Construction, current edition.

B. Agitate bulk materials during transport.

1.4 MAINTENANCE

A. Extra Materials: Provide 10 gallons in unopened containers.

PART II – PRODUCTS

2.1 MATERIALS

A. Provide one of the following surface seals:

Product Name	Manufacturer
1. Guard-Top	CALMAT / Industrial Asphalt
2. Over Kote	Diversified Asphalt Product
3. Park Top	Western Colloid Products
4. Sure Seal	Asphalt Coating Engineering
5. Super Drive Top.	SAF– T Seal. Inc.
6. Equal.	

PART III – EXECUTION

3.1 SURFACE PREPARATION

A. Thoroughly wash surfaces with water to remove dirt, debris, excessive oil and grease, or other foreign matter.

3.2 APPLICATION

A. Inspect Install seal coat in strict accordance with manufacturer's written directions and recommendations.

B. Install two coats of surface seal to new bituminous surfacing. First coat shall be installed before flood testing. Clean surface and allow to dry before installing second coat. Second coat shall be installed after bituminous surfacing has passed flood test.

C. Where new bituminous surfacing is installed adjacent to existing bituminous surfacing, overlap surface seal a minimum of 12 inches onto existing bituminous surfacing.

D. Where existing bituminous surfacing is indicated to be patched and sealed, install two coats of surface seal after patching. Refer to Section 32 1216 - Asphalt Paving.

3.3 PROTECTION OF SURFACES

A. Protect sealed and unsealed surfaces from damage and traffic during performance of the Work of this section and until surface seal has thoroughly set and cured. Do not permit traffic of any kind for at least 24 hours after completion of installation.

B. Protect the Work of this section until Substantial Completion.

3.4 TESTING

A. Owner reserves the right to obtain samples, perform tests to ensure compliance with the Specifications, and to review weight slips and invoices of materials delivered to the Project site.

3.5 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 13 13

SITE CONCRETE WORK

PART I – GENERAL

1.1 SUMMARY

A. Section Includes: On-site concrete work:

1. Portland cement concrete pavement, driveways curbs, gutter and mowing strips.
2. Ramps and stairs on grade.
3. Footings for fence posts, bollards, flagpoles, shade structures, light standards and athletic and playground equipment.
4. Pipe encasements, thrust blocks, and equipment pads.
5. Retaining walls, planter walls and concrete benches.
6. Skateboard deterrents.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 03 1000 - Concrete Forming and Accessories.
3. Section 03 2000 - Concrete Reinforcement.
4. Section 03 3000 - Cast-in-Place Concrete.
5. Section 07 9200 - Joint Sealant.
6. Division 26 - Electrical.
7. Section 31 2200 - Grading.
8. Section 31 2316 - Excavation and Fill for Pavement.
9. Section 31 2326 - Base Course.
10. Section 32 1216 - Asphalt Paving.
11. Section 33 1100 - Site Water Distribution Utilities.
12. Section 33 3300 - Site Sanitary Sewer Utilities.
13. Section 33 4000 - Storm Drainage Utilities.

1.2 REFERENCES

A. Structural work, such as retaining walls, planter walls, cast-in-place benches, equipment pads, and footings for playground equipment, fences, walls, shade structures and flagpoles shall conform to the following Sections:

1. Section 03 1000 Concrete Forming.
2. Section 03 2000 Concrete Reinforcing.
3. Section 03 3000 Cast-in-Place Concrete.

B. Flatwork, such as walkways, driveways, ramps and steps on grade, swales, curbs, mow strips and utility related concrete, conform to:

1. Standard Specifications for Public Works Construction, The "Greenbook", except reclaimed aggregates and processed miscellaneous base are not allowed.

C. Imported or exported earthwork shall conform to Section 01 4524 Environmental Import / Export Materials Testing.

D. National Ready Mixed Concrete Association (NRMCA):

1. Checklist for the Concrete Pre-Construction Conference.

1.3 QUALITY ASSURANCE

A. Source Limitations for Exposed Concrete: Obtain each color, size, type, and variety of concrete material and concrete mixture from single manufacturer with resources to provide concrete of consistent quality in appearance and physical properties. Secure material required for the duration of the project as needed to ensure consistent quality in appearance.

B. Pre-Installation Conference:

1. CONTRACTOR shall coordinate and conduct pre-installation conference in conformance to Section 01 3119 Project Meetings.
2. CONTRACTOR shall use the NRMCA "Checklist for the Concrete Pre-Construction Conference" as the meeting agenda.

C. Mockup:

1. Build 8 feet by 8 feet mockups of full-thickness sections of concrete paving using processes and techniques intended for use on permanent work, including curing procedures.
2. Build mockups to demonstrate typical joints; surface finishes and standard of workmanship.
3. Obtain ARCHITECT's approval of mockup before proceeding with work of this Section.
4. Mockup shall remain through completion of the work for use as a quality standard for finished work.
5. Remove mockup when directed by the OAR.

D. Field applied primers, paintings, sealers, sealants, caulking, leveling and patching compounds, crack/joint repair compounds adhesives and similar products shall be approved by the OWNER's Office of Environmental Health and Safety (OEHS).

1.4 SUBMITTALS

A. Structural Work: Conform to the applicable requirements of Sections 03 1000 Concrete Forming, 03 2000 Concrete Reinforcing and 03 3000 Cast-in-Place Concrete.

B. Flatwork: Submit mix design in conformance to the Greenbook.

C. Shop Drawings: Submit drawings indicating the locations of concrete joints, including construction joints, expansion joints, isolation joints, and contraction joints.

D. Submit concrete Sample of each specified color.

E. Submit full range of manufacturer's standard and custom range colors and products for ARCHITECT's review and selection.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store cement and aggregate materials so to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.

B. Packaged materials shall bear the manufacturers and brand name label and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.

C. Avoid exposure of reinforcing steel bars, wire, and wire fabric to dirt, moisture or conditions harmful to reinforcing.

D. Reinforcing steel bars, wire, and wire fabric shall be stored on the Project site to permit easy access for examination and identification of each shipment. Material of each shipment shall be separated by size and shape.

PART II – PRODUCTS

2.1 MATERIALS

A. Structural Work: Conform to the applicable requirements of the following Sections, except as otherwise specified:

1. Section 03 1000 Concrete Forming.
2. Section 03 2000 Concrete Reinforcing.
3. Section 03 3000 Cast-in-Place Concrete.
4. Section 07 9200 Joint Sealants.

B. Flatwork: Conform to the applicable requirements of the Greenbook, Section 201, except as follows:

1. Water/cement ratio for concrete flatwork shall be 0.50 maximum.
2. Base course shall conform to Section 32 3226 Base Course.
3. Reclaimed concrete material shall not be used.

2.2 SKATEBOARD DETERRENTS

A. Manufacturer: Barrett Robinson Inc. or equal.

B. Fabricated from 6061-T6 aluminum, clear anodized.

1. Fixed Angle Series:
    a. FR0.12: For walls with 1/8" radius edge. Dimensions: 4.875" top x 1.0" face x 2.0" wide.
    b. FA90A: For walls with 1/8" radius edge. Dimensions: 4.0" top x 2.375" face x 2.0" wide.
    c. FA135: For chamfered edges, where the chamfer is 3/4” or more. Dimensions: 2" wide X 3-1/2" long X 1-1/8" tall.
    d. FA902.5: For 90 degree walls with 1/2" radius edge. Dimensions: 3.75" top x 2.375" face x 2.0" wide.
2. Fixed Radius:
    a. FR.12: For 1/8" radiused edges. Dimensions: 4.875" top x 1.0" face x 2.0" wide.
    b. FR.05: For 1/2" radiused edges. Dimensions: 3.75" top x 1.0" face x 2.0" wide.
    c. FR1.0: For 1" radiused edges. Dimensions: 4.375" top x 1.625" face x 2.0" wide.
3. Gorilla Series:
    a. Gorilla 012: Rounded edge. For square corners from 0” - 3/8” radius. Size: 1-1/8” wide x 8” deep x 1-1/8”.
    b. Gorilla 0135: Chamfered edge. For square corners from 0” - 3/8” radius. Size: 1-1/8” wide x 8” deep x 1-1/8”.
4. Two-part epoxy adhesive shall be approved by the OWNER’s Office of Environmental Health and Safety (OEHS).
5. Fastening pins as recommended by skateboard deterrent manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that gradients and elevations of base are correct. Maintain subgrade clean and in a smooth, compacted condition until the concrete is placed.

B. Maintain subgrade in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. Earth surface shall be kept moist by frequent sprinkling up to the time of placing concrete.

3.2 CONSTRUCTION OF FORMS

A. Flatwork Forming: Set forms to the indicated alignment, grade and dimensions. Hold forms rigidly in place by a minimum of 4 stakes per form placed at intervals not to exceed two feet. Use additional stakes and braces at corners, deep sections, and radius bends, as required. Use clamps, spreaders, and braces where required to ensure rigidity in the forms.

B. Wall Formwork: Forms shall be constructed to conform to final concrete shape, lines and dimensions of members required by Drawings and Specifications. Forms shall be sufficiently tight to prevent leakage of concrete and properly braced or tied together to maintain position and shape.

3.3 STEEL REINFORCEMENT INSTALLATION

A. Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are not permitted.

B. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

C. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces, and lace splices with wire.

D. Clean reinforcement of loose rust and mill scale, earth, or bond-reducing materials.

3.4 PREPARATION FOR CONCRETE PLACEMENT

A. Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.

B. Do not place concrete until forms, reinforcement, pipe, conduits, outlet boxes, anchors, sleeves, bolts, and other embedded materials are securely fastened in place. Maintain a minimum of two inches clearance between said items and any part of the concrete reinforcement.

C. Adjust pull boxes, meter boxes, valve covers and manholes to proposed finish grade prior to placement of concrete. Anchor bolts shall be accurately set and maintained in position by templates while being embedded in concrete.

D. Clean thoroughly the surfaces of metalwork to be in contact with concrete, remove dirt, grease, loose scale and rust, grout, mortar, and other foreign substances before the concrete is placed.

E. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

3.5 CONCRETE PLACEMENT

A. Place, compact, screed, float and trowel concrete as indicated in Section 03 3000

Cast-in-Place Concrete.

B. Finish: After straightening, when most of the water sheen has disappeared and just before the concrete hardens, finish the surface with a wood or magnesium float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. Produce a scored surface by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, followed by edging.

1. Provide medium broom finish on surfaces up to six percent slope by striating surface 1/32 to 3/64 inch deep with a soft bristle broom across concrete surface to provide a uniform fine line texture.
2. Provide heavy broom finish on surfaces over six percent by striating surface 1/16 inch to 1/8 inch deep with a stiff-bristled broom.

C. Concrete paving and other paving finishes along accessible route of travel shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.

3.6 JOINTS

A. Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated. Align curb, gutter, and sidewalk joints.

B. Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour.

1. Continue steel reinforcement across construction joints unless otherwise indicated on the Drawings.
2. Provide tie bars at sides of paving strips where indicated on the Drawings
3. Butt Joints: Use bonding agent or epoxy-bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1- 1/2 inches into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated on the Drawings.

D. Expansion Joints:

1. Provide premolded joint fillers in one-piece lengths. Where more than

one length is required, lace or clip joint-filler sections together. Extend expansion joint fillers full-width and depth of joint, and 1/4" below finished surface where joint filler is indicated. If no joint sealer is indicated place top of premolded joint filler flush with top of concrete or curb.

2. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

E. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints to a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Remove grooving-tool marks on concrete surfaces.
2. 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 and before developing random contraction cracks.
3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

F. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Remove edging-tool marks on concrete surfaces.

G. Where concrete is to be cast against old concrete, (greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by sand-blasting, exposing the aggregate. The hardened surface shall be cleaned of latent foreign material and washed clean, prior to the application of an epoxy bonding agent.

3.7 STAIRS AND RAMPS

A. Install support post sleeves into the perimeter concrete curbing during the installation process of the curbing. Sleeves shall be three-inch diameter, schedule 40 PVC with a cap solvent welded to the bottom of the sleeve. Drill a half-inch weep hole on the bottom of the cap. Sleeve and cap shall be Nibco products or approved equal. Sleeves shall be embedded into concrete a minimum of nine inches and spaced at a maximum of four feet, or as indicated on the Drawings. Fill sleeve with non-shrink grout Quickcrete #1585-01 when setting

posts. Provide control joints into the concrete on both sides for each post.

B. Finish step nosings with a safety step edger/groover with a 1/2 inch radius and four grooves spaced equally 3/4 inch on center and a bit depth between 1/4 to 3/8 inch. Paint with contrasting color.

3.8 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

A. Formed Curb and Gutter: Place concrete to the required section in a single lift. Consolidate concrete using approved mechanical vibrators. Finish curve shaped gutters with a standard curb mule or concrete slipformed curb paving equipment.

B. Concrete Finishing: Float and finish exposed surfaces with a smooth wood float until true to grade and section and uniform in texture. Brush floated surfaces with a fine-hair brush using longitudinal strokes. Round the edges of the gutter and top of the curb with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, rub the face of the curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Brush the front curb surface, while still wet, in the same manner as the gutter and curb top. Finish the top surface of gutter to grade with a wood float.

C. Surface and Thickness Tolerances: Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.9 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project Site.

3.10 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 32 31 20

DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide decorative steel fence system including gates, manually operated, framing, and accessories as required for complete fence installation as indicated.

1. Excavate for post bases and provide concrete anchorage for freestanding posts, provide sleeves and grout posts embedded in concrete construction.

B. Related Sections:
1. Section 05 50 00: Miscellaneous metal fabrications.

1.2 REFERENCES

A. American Welding Society (AWS): D1.1, Structural Welding Code.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Design/Build: Provide special engineering to ensure compliance with applicable codes and Contract Documents.

1.4 SUBMITTALS

A. Product Data: Submit product literature for gates and operators, gate hardware, grout, and manufactured items.

B. Shop Drawings: Indicate fence and gate layout, spacing of components, connections, fabrication details, accessories, and anchorage.

1. Indicate profiles, sizes, connections, and anchorage.
2. Provide templates as required for anchor installation by others.

C. Samples: Submit samples fence section with welds and finish.

D. Design/Build Certificates: Submit certification signed by California licensed structural engineer indicating compliance with Contract Documents and code requirements.

1.5 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with *CAL*Green requirements including those relative to finish material pollution control for paints and coatings.

B. Fabricator: Firm with minimum five years successful experience fabricating custom steel fences and gates like those required for Project.

1. Provide fence and gates by same fabricator.

C. Mock-Up: Provide three panels and posts of Owner and Architect review; approved mock-up may be incorporated into Project where undamaged.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide decorative steel fence system including gates, manual and automatically operated, framing, and accessories.

B. Regulatory Requirements: Design fence and gates to support loads as required by California Building Standards Code.

C. Performance Criteria: In addition to applicable code requirements, design to support minimum lateral force of 50 lbs./lin. ft. uniform load and 200 lbs. at any single point without permanent set or damage; ASTM E935.

D. Steel Shapes, Plates and Bars: ASTM A36; shapes and sizes as indicated on Drawings; provide weights suitable for specified loads; galvanized.

E. Structural Steel Sheet: Hot rolled, ASTM A1011; or cold rolled, ASTM A1008, Class 1; of grade required for design loading; galvanized.

F. Steel Tubing: Cold formed ASTM A500; or hot rolled, ASTM A501; minimum Grade B; seamless where exposed; galvanized.

G. Grout: Non-shrink meeting ASTM C1107 non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

H. Fasteners and Rough Hardware: Type required for specific usage; provide zinc-coated fasteners.

I. Welding Materials: AWS D1.1, type required for materials being welded.

J. Primer: Provide primers as recommended by paint manufacturers for substrates and paints specified in Section 09 90 00 – Painting and Coating.

1. Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in galvanized steel.

K. Concrete: ASTM C94, normal Portland cement, 2,500 psi at 28 days, 2" to 3" slump, 2 to 4 percent entrained air.

2.2 FABRICATION

A. Framework: Design and fabricate fence to withstand anticipated loads, including loads from people climbing on fence.

1. Configurations: As indicated, welded construction unless otherwise indicated.

2. Fittings: Provide fittings and accessories as required for complete installation.

B. Fencing Panels and Gates:

1. Manufacturer/Basis of Design: Ameristar

2. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

3. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

C. Gates: Fabricate gates as indicated, welded construction.

1. Swing Gates: Provide complete with hardware.

a. Pivots: Lift-off type, extra heavy-duty ball bearing pivots, sized for anticipated gate loads plus additional live loads of up to 500 lbs per gate leaf, without damage to system.

1) Provide full surface offset pivots to permit 180-degree opening, minimum 1-1/2 pair per gate leaf.

2) Provide set screws to prevent accidental gate removal due to seismic activities or vehicular impact.

3) Weld pivot to gates and frames.

b. Accessories: Keepers, stops, and accessories as required for complete, secure manually operated fence gate installation.

2. REGULATORY REQUIREMENTS**:**

a. Locate latching hardware between 34 inches to 44 inches above the finished floor, per 2019 California Building Code, Section 11B-404.2.7.

1) Panic hardware: locate between 36 inches to 44 inches above the finished floor.

b. Handles, pull, latches, locks, other operable parts**:**

1) Readily openable from egress side with one hand and without tight grasping, tight pinching, or twisting of the wrist to operate. 2019 California Building Code Section 11B-309.4.

2) Force required to activate the operable parts: 5.0 pounds maximum, per 2019 California Building Code Section 11B-309.4.

c. Adjust gate to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2019 California Building Code Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds.

d. Adjust gate closer sweep periods so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per 2019 California Building Code Section 11B-404.2.8.

e. Spring hinges: adjust for 1.5 seconds minimum for 70 degrees to fully-closed.

f. Smooth surfaces at bottom 10 inches of push sides of doors, facilitating push-open with wheelchair footrests, per 2019 California Building Code Section 11B-404.2.10.

g. Applied kickplates and armor plates: bevel the left and right edges; free of sharp or abrasive edges.

h. Door opening clear width no less than 32 inches, measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 30 inches and below 80 inches, and the hardware projects no more than 4 inches. 2019 California Building Code Section 11B-404.2.3.

i. Door closers and overhead stops: not less than 78 inches above the finished floor or ground, per 2019 California Building Code 11B-307.4.

j. Thresholds**:** floor or landing no more than 0.50 inches below the top of the threshold of the doorway, per 2019 California Building Code Section 11B-404.2.5. Vertical rise no more than 0.25 inches, change in level between 0.25 inches and 0.50 inches**:** beveled to slope no greater than 1**:**2 (50 percent slope). 2019 California Building Code Section 11B-303.2 & ~.3.

k. Floor stops**:** Do not locate in path of travel. Locate no more than 4 inches from walls, per DSA Policy #99-08 (Access).

l. Door and door hardware encroachment**:** when door is swung fully-open into means-of-egress path, the door may not encroach/project more than 7 inches into the required exit width, with the exception of door release hardware such as lockset levers or panic hardware. These hardware items must be located no less than 34-inches and no more than 48-inches above the floor/ground. 2019 California Building Code, Section 1005.7.1.

D. Fabricate items with joints neatly fitted and properly secured.

E. Grind exposed welds continuous, smooth and flush with adjacent finished surfaces, and ease exposed edges to approximate 1/32" uniform radius.

F. Exposed Mechanical Fastenings (Slide Gate Hardware Only): Flush countersunk fasteners unobtrusively located, consistent with design of structure.

G. Fit and shop assemble in largest practical sections for delivery.

H. Make exposed joints flush butt type, hairline joints where mechanically fastened.

1. Fabricate joints exposed to weather in manner to exclude water or provide weep holes where water could accumulate.

I. Supply components required for proper anchorage of custom steel fence; fabricate anchorage and related components of same material and finish as custom steel fence.

J. Finishing: Galvanize and prime paint custom steel fencing; comply with requirements of Section 09 90 00 – Painting and Coating for preparation and priming.

1. Preparation: Thoroughly clean surfaces of rust, scale, grease and foreign matter prior to applying finishes.

2. Galvanizing: Provide minimum ASTM A123 or A924 and A653 G90 coating; iron and steel hardware galvanized conforming to ASTM A153.

3. Priming: Comply with requirements in Section 09 90 00 – Painting and Coating; do not shop prime surface areas requiring field welding; shop prime in one coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication.

3.2 INSTALLATION

A. Install fence, gates, and accessories to provide rigid structure for configurations indicated as specified and in accordance with applicable code requirements.

B. Install line, corner, and terminal posts plumb in locations indicated on Drawings.

1. Coordinate embedded post sleeves with concrete work.
2. Grout posts solid where indicated on Drawings.

C. Install gates for free, easy operation.

1. Install automatic gate operators in accordance with manufacturer recommendations and installation instructions for proper smooth operation; test gate operation and adjust as necessary for maximum lifespan of system.

D. Obtain Architect's review prior to site cutting or making adjustments that are not part of scheduled work.

E. Install components square and level, accurately fitted and free from distortion or defects detrimental to appearance or performance.

1. Supply items required to be cast into or embedded in other materials to appropriate trades.

2. Ensure alignment with adjacent construction; coordinate with related work to ensure no interruption in installation.

F. Make provision for erection stresses by temporary bracing; keep work in alignment.

G. Field bolt and weld to match standard of shop bolting and welding; hide bolts and screws whenever possible, where not hidden, use flush countersunk fastenings.

1. Perform field welding in accordance with AWS D1.1.
2. Bolting permitted for slide fence hardware only.

H. After installation, touch-up field welds and scratched and damaged surfaces; use same primer as used for shop coat.

I. Replace items damaged in course of installation and construction.

END OF SECTION

SECTION 33 11 00

SITE WATER DISTRIBUTION UTILITIES

PART I – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Site water distribution systems located outside the building perimeter, extending to an existing water line or meter.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Division 22 - Plumbing.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2323 - Excavation and Fill for Utilities.
5. Section 31 0117 - Pavement Repair.
6. Section 33 1313 - Site Concrete Work

1.2 SUBMITTALS

A. Shop Drawings: Submit the site plan indicating locations of lines, valves, and related appurtenances.

B. Product Data: Manufacturer’s catalog data for materials. Include technical data for accessories, gaskets, joints and couplings.

C. Certificates: Certificates attesting that tests set forth in referenced publications have been performed, and the performance requirements have been satisfied.

1.3 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. American National Standards Institute (ANSI):
    a. ANSI H23.1 – Seamless Copper Water Tube.
2. NSF International (NSF):
    a. ANSI/NSF 61 Drinking Water System Components – Health Effects
    b. ANSI/NSF 372 Drinking Water System Components – Lead Content.
3. American Society of Mechanical Engineers (ASME):
    a. ASME B16.18 – Cast Copper Alloy Solder Joint Pressure

Fittings.

b. ASME B16.22 – Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
c. ASME B16.26 – Cast Copper Alloy Fitting for Flared Copper Tubes.
d. ASME B16.51 – Copper and Copper Alloy Press-Connect Pressure Fittings.

4. American Society for Testing and Material (ASTM) International:
   a. ASTM A36 - Standard Specification for Carbon Structural Steel.
   b. ASTM A240 – Standard Specification for chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
   c. ASTM A312 – Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
   d. ASTM A536 – Standard Specification for Ductile Iron Castings.
   e. ASTM B61 – Standard Specification for Steam or Valve Bronze Castings.
   f. ASTM B62 – Standard Specification for Composition Bronze or Ounce Metal Castings.
   g. ASTM B75 – Standard Specification for Seamless Copper Tube.
   h. ASTM B88 – Standard Specification for Seamless Copper Water Tube.
   i. ASTM B152 – Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar.
   j. ASTM 17 – Standard Specifications for Copper Alloy Sand Castings for General Applications.
   k. ASTM D1784 – Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
   l. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
   m. ASTM D3035 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Diameter.
   n. ASTM D3139 – Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
   o. ASTM D3261 –Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
   p. ASTM D3350 – Standard Specification for Polyethylene Plastics and Fittings Materials.

q. ASTM F2620 – Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.
r. ASTM F2206 – Standard Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE).
s. ASTM F477 – Standard Specification for Elastomeric Seals for Joining Plastic Pipe.
t. ASTM F174 – Standard Specification for Polyehtylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.

5. American Water Works Association (AWWA):
   a. AWWA C104/A21.4 – Cement-Mortar Lining For Ductile-Iron Pipe and Fittings.
   b. AWWA C110/A21.11 – Ductile-Iron and Gray-Iron Fittings.
   c. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   d. AWWA C115/A21.15 - Standard for Flanged Ductile-Iron Pipe with Threaded Flanges.
   e. AWWA C153/A21.53 – American National Standard for Ductile-Iron Compact Fittings for Water Service.
   f. AWWA C207 – Steel Pipe Flanges for Waterworks Service Sizes 4 In. Through 144 In.
   g. AWWA C500 - Metal Seated Gate Valves for Water Supply Service.
   h. AWWA C503 - Wet- Barrel Fire Hydrants.
   i. AWWA C508 - Swing-Check Valves for Waterworks Service, 2 inches through 24 inches (50-mm through 600-mm) NPS.
   j. AWWA C510-89 - Standard for Double Check Valve Backflow-Prevention Assembly.
   k. AWWA C511 - Reduced-Pressure Principal Backflow-Prevention Assembly.
   l. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
   m. AWWA C800 - Underground Service Line valves and Fittings.
   n. AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings 4 In. Through 12 In., for Water Transmission and Distribution.
   o. AWWA C901 – Polyethylene (PE) Pressure Pipe and Tubing, 3/4 In. Through 3 In., for Water Service.
   p. AWWA M23 - PVC Pipe - Design and Installation.
   q. AWWA M55 - PE Pipe - Design and Installation.
6. Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry):
   a. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.
7. Uni-Bell PVC Pipe Association (UBPPA):
   a. UBPPA UNI-PUB-09 - Installation Guide for Gasketed-Joint

PVC Pressure Pipe (C900).

8. Underwriters Laboratories Inc. (UL):
    a. UL 246 – Standard for Hydrants for Fire-Protection Service.
    b. UL 262 – Standard for Gate Valves for Fire-Protection Service.
    c. UL 312 – Standard for Check Valves for Fire-Protection Service.
9. National Pollutant Discharge Eliminations System (NPDES).
    a. Comply with storm water requirements of general permit for storm water discharges when flushing pipe systems including storm drains and maintaining logs.
10. Plastic Pipe Institute (PPI):
    a. TN-38 – Bolt Torque for Polyethylene Flanged Joints.
    b. TR-4 – Technical Report requirements of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipes.
    c. TR-33 – Technical Report for Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe.

B. Provide valves from the same manufacturer.

C. Manufacturer of plumbing products must be third-party certified to ANSI/NSF Standard 61, Section 9 certification, and ANSI/NSF 372 to demonstrate compliance with the federal requirements for lead contribution to drinking water, the Safe Drinking Water Act SDWA, and the California Health and Safety Code Section 116875. No pipe, pipe fitting, or any other fitting or fixture intended to convey or dispose water for human consumption for drinking or cooking is allowed in the domestic plumbing system, if they do not meet the low lead definition of Health and Safety Code 116875. Weighted average lead content of the wetted surface area of pipes, fittings and fixtures may not exceed 0.25 percent.

D. Qualifications of Manufacturer: Products used in the Work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production as reviewed by the ARCHITECT.

1.4 PRODUCT HANDLING

A. Store Items above ground on platforms, skids, or other required supports.

B. Protect materials from direct sunlight.

C. Protect coating and linings on piping, fittings, and accessories from damage. Repair and/or replace damaged coatings or linings.

PART II – PRODUCTS

2.1 MATERIALS

A. Pipes, Fittings, and Joints:

P-1: Underground water service pipe sizes up to 3-inch shall be Copper water tubing, Type K hard, ANSI H23.1, ASTM B88, IAPMO IS. Manufacturer: Mueller, Cerro Brass, Cambridge-Lee, Halstead, or equal.

An approved protective water service pipe sizes up to 3-inch shall be used to completely isolate and protect underground copper tubing and extend past the surface a minimum 12-inch. The excess wrapping shall be trimmed down and taped to copper tubing with 10 mill PVC pipe tape at grade level of concrete or asphalt.

PF-1a: Copper Press-Connect pressure fittings, comply with ASME B16.51 with Ethylene Propylene Diene Monomer, EPDM O-Ring Seal in each end. Fittings with the sizes of 2-1/2” and larger shall have cross-section Grab Rings and separation rings.

Manufacturer: Viega, Mueller Industries, Apollo, or equal.

PF-1b: Wrought Copper – solder type ASME B 16.22.

Manufacturer: Mueller Brass, Nibco, Lee Brass or equal.

PF-1c: Grooved end type- ASTM B75 or ASTMB152 and ASTM B584 copper alloy CDA 836 per ASME B16.18. Couplings shall be CTS style 606 supplied with angle pattern bolt pads for rigidity, coated with copper coated alkyd enamel. Gaskets shall be pre-lubricated Flush seal type.

Manufacturer: Victaulic or equal.

P-2: Underground water service pipe sizes up to 3-inch shall be high density polyethylene pipe (HDPE) with tracer wire. Pipe and fitting system shall be pressure class 333 (DR7). All material shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350 with a minimum cell classification of 445474C. HDPE pipe and fittings shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. HDPE products shall be homogeneous throughout

and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

Pipe sizes smaller than 3” shall be manufactured to the dimensional requirements listed in ASTM D3035, and 3” Pipes shall have a manufacturing standard of ASTM F714. Pipes and fittings shall meet AWWA C901 and shall be listed as meeting NSF-61.

Installer shall be certified by manufacturer for HDPE pipe and joint installation.

Manufacturer: ISCO, JM Eagle or Equal.

PF-2a: Butt Fusion HDPE Fittings shall meet the following requirement:

a. Molded fittings shall comply with the requirements of ASTM D 3261.
b. All fabricated elbows, tees, reducing tees and end caps shall be produced and meet the requirements of ASTM F2206.
c. Socket fittings shall meet ASTM D 2683.
d. Installer shall be certified by manufacturer for this type of joint installation.

Manufacturer: ISCO, JM Eagle or Equal.

PF-2b: Bolted Connections- Flanges and MJ Adapters shall be fused onto the pipe and have a minimum pressure rating equal to or greater than the pipe and shall meet the following requirement:

a. Metallic back-up rings (Van-Stone style lap joint flanges), shall have a radius on the inside diameter of the bore so as to be compatible with HDPE Flanges. Back up rings shall have bolt pattern that will mate with AWWA C207 Class D (generically known as 150 pound patterns).
b. Flange assemblies shall be assembled and torqued according to PPI TN-38.
c. Installer shall be certified by manufacturer for this type of joint installation.

P-3: Underground water service pipe sizes 4-inch and larger shall be C900 water service pipe material complying with AWWA C900, and ASTM D1784 Cell Class 12454B with tracer wire, NSF and UL listed. Piping shall be plain end or gasket bell end, pressure class 305 (DR14) with cast iron pipe equivalent outside diameter.

PF-3: Fire Water Service, Domestic Water and Irrigation Service Line Fittings, Joints and Jointing Materials shall be Ductile-iron with mechanical joints conforming to AWWA C110/A21.10 or AWWA C153/A21.53, C900 compatible, and shall have cement mortar lining conforming to AWWA C104/A21.4, standard thickness unless otherwise indicated on Drawings.

a. Pipe joints shall be push on as specified in ASTM D3139.
b. Joints between pipe and metal fittings, valves, and other accessories shall be mechanical joints as specified in AWWA C111/A21.11.
c. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling installation.
d. Gaskets for push on joints for pipe shall conform to ASTM F477
e. Gaskets for push on joints and compression type joints or mechanical joints for connections between pipes and metal fittings, valves, and other accessories shall be as specified in AWWA C111/A21.11.
f. Sleeve-type mechanically coupled joints may be provided instead of push-on joints on plain-end PVC plastic joints. Comply with requirements of ASTM D3139.
g. Comply with installation guide UBPPA UNI-PUB-09.

Manufacturer: JM Eagle, Diamond Plastics, North American Pipe, or equal.

P-4: Aboveground water service pipe shall be Type 316L Stainless Steel, Schedule 40 water pipe, marked with manufacturer's identification and fittings. Manufacturer's representative shall instruct installers and certify them for joint installation. Piping system shall be provided with a five-year manufacturer’s material warranty.

Manufacturer: Viega, or equal.

PF-4: Type 316L Stainless Steel, Schedule 40 Press Fittings. For water service piping systems, provide with EPDM seals. Manufacturer's representative shall instruct installers and certify them for joint installation.

Manufacturer: Viega, or equal.

D. Gates Valves for PVC:

1. Non-rising stem type with resilient wedge gates or iron body bronze

wedge gates and mechanical joint ends conform to AWWA C500.

2. Non-rising stem type with mechanical joints ends shall conform to AWWA C509.
3. Valves designed for a working pressure of 175 PSI shall be inside-screw type with operating nut, and resilient wedge type gate. Valve shall be provided with mechanical joints as required for the pipe to which it is intended to connect.
4. Valves with UL listing of 262 shall conform to AWWA C500. Valves shall open by counter-clockwise rotation of valve stem.
5. Stuffing boxes shall be provided with O-ring stem seals and shall be bolted and constructed to permit easy removal of parts for repair.
6. Sleeve type mechanical couplings may be provided instead of mechanical and push on joint ends.
7. Valve ends and gaskets for connection to sleeve type mechanical couplings shall conform to specified requirements for the joint or coupling.

E. Gate Valves in Valve Pits:

1. Outside screw and yoke rising stem type valves with resilient wedge gates and flanged ends shall conform to AWWA C500.
2. Outside screw and yoke rising stem type valves with flanged ends shall conform to AWWA C509.
3. Outside screw and yoke type Valves with double disc gates or split-wedge type gate and flanged ended ends shall be designed for 175 psi and conform to UL 262.
4. Provide valves with hand wheels that open by counterclockwise rotation of the valve stem.
5. Stuffing boxes shall be provided with O-ring stem seals and shall be bolted and constructed to permit easy removal of parts for repair.

F. Check Valves for PVC:

1. Valves shall be swing-check type conforming to AWWA C508 or UL 312.
2. Valves shall be provided with cast iron or steel body and cover, flanged ends and clear port opening.
3. Valves shall be designed for a working pressure of 175 PSI.

G. Fire Hydrants:

1. Before procurement, verify approval issued by the County of Los

Angeles or Fire Department having jurisdiction.

2. Hydrants shall be wet barrel types conforming to AWWA C503 or UL 246.
3. Only 1¾-inch pentagonal nuts are to be provided on stems and protective caps.
4. Specified hydrants:
    a. Clow/Rich # 850 or 860
    b. James Jones #J3700 Fluted Spoo
    c. Equal.

H. Valve Boxes: 14 ¾-inch by 20-inch by 12-inch cast concrete with cast iron, traffic grade cover marked “WATER” (for use over water valves).

1. Brooks 36-H MB with No. 36-T cast iron cover EISEL 363.5, or equal.

I. Mechanical Thrust Restraint:

1. Restraint shall be incorporated into the follower gland.
2. Restraint shall consist of individually actuated wedges that increase resistance to pull out as internal pressure or external forces increase.
3. Gland shall be ductile iron conforming to ASTM A536.
4. Provide twist off nuts and tee-head bolts of the same size to ensure proper actuating of restraint devices.
5. Restraining device shall be provided with pressure rating equal to that of the pipe on which it is installed.
6. Restraining gland shall be UL listed.

J. Restraint Device Adapters:

1. Restrained flange adapters shall be provided instead of threaded or welded flange spool pieces on plain end of ductile iron or PVC pipe.
2. Flange adapters shall be manufactured of ductile iron conforming to ASTM A536 and be provided with flange bolt circles compatible with AWWA C115/A21.15.
3. Restraint of flange adapter shall consist of a multiple number of individually actuated gripping wedges to maximize restraint capability.
4. Torque limiting actuating screws shall be provided to insure proper initial set of gripping wedges.
5. Flange adapter shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow at least 0.6 inch of gap between end of pipe and mating flange without affecting integrity of seal.

6. Flange adapter shall be provided with a safety factor of at least 2:1 for rated pressure.
7. Restraint device adapters shall be EBAA Iron “Megaflange”, or equal.

K. Tracer Wire for Nonmetallic Pipes: Tracer wires shall be continuous solid copper wire type THWN, 12 AWG gauge, with heat and moisture resistance insulation. Blue plastic covered for domestic water and red for fire sprinkler. (Aluminum wire is prohibited). Provide in sufficient length to be continuous over each installed section of nonmetallic pipe.

L. Pipe markers shall be a concrete plaque inscribed with the word “WATER.”

M. Water Service Line Materials:

1. Water Service Line Piping Material: Refer to article 2.01.A within this section.
2. Water Service Line Appurtenances:
    a. Corporation stops shall be ground key type; manufactured of bronze conforming to ASTM B61 or ASTM B62; and suitable for the working pressure of the system. Ends shall be suitable for solder-joint or flared tube compression type joint connection. Threaded ends for inlet and outlet of corporation stops shall conform to AWWA C800; coupling nut for connection to flared copper tubing and shall conform to ASME B16.26.
    b. Goosenecks shall be type K copper tubing. Joint ends for goosenecks shall be as required for connecting to corporation stop and service line.Where multiple gooseneck connections are required for individual service, connect goosenecks to service line through brass or bronze branch connection; the total clear area of branches shall be at least equal to clear area of service line. Length of goosenecks shall be as indicated or required.
    c. Curb or service stops shall be ground key, round way, inverted key type; bronze, conforming to ASTM B61 or ASTM B62; and rated at 150 psi. Ends shall be as required for connection to service piping. Arrow shall be cast into body of curb or service stop indicating direction of flow.
    d. Gate valves 2.5-inch and larger shall be MSS SP-80, Class 150, solid wedge, or resilient wedge gate, and non-rising stem. Valves shall be provided with flanged end connections. Provide hand wheel operators if easily accessible. Provide operating nut if inside a vault, pit or valve box.
    e. Gate valves in valve pits 2-inch, and smaller shall be MSS SP-80, Class 150, bronze, solid wedge, inside screw, rising stem. Valves shall be provided with flanged end connections or threaded end connections with union on one side of valve and

hand wheel operator.

f. Valve boxes shall be provided at each gate valve installed underground. Valve boxes shall be a size suitable for valve on which it is installed.

N. Water meter will be installed by water purveyor for the area, unless noted otherwise.

O. Strainers:

STR-1 Description: Wye type with Monel or Stainless Steel strainer cylinder (manufacturer's standard mesh), and gasketed machine strainer cap. Where indicated on Drawings, provide with valved (globe valve) blow out piping, same size as blow out plug:

2-inch and smaller: C.M. Bailey #100-A, bronze, 250 pound, or ductile iron with fusion bonded epoxy coating.

2½-inch and larger: Watts 77F-DI-FDA-125 pound, or other ductile iron fusion bonded epoxy coated flanged strainer, conforming to ASTM A312 for the strainer body, and ASTM A240 for the stainless steel strainer element. (No iron body strainer shall be used on potable water that is not fusion bonded epoxy coated inside and out.

C.M.Bailey, Armstrong, Wilkins, Watts, or equal

STR-2 "Y" pattern, cast iron bodies, 125 psi, Monel screen 16 square. mesh. Open area at least twice the cross-sectional area of IPS pipe in which strainer is installed and may be woven wire or perforated type. Screwed ends for sizes up to 2-inch, flanged ends for 2 ½-inch and larger perforations, in accordance with the following:

Bailey #100, Armstrong, Rp & C, Keckley, or equal.

STR-3 Bucket type, flange, semi-steel body, 125 psi, stainless steel screen with 1/8 inch diameter perforations (mounted above grade for water service). All sizes, for lines serving fire sprinkler risers.

PART III – EXECUTION

3.1 PREPARATION

A. Protect and maintain installed stakes until their removal is required for the Work. Provide replacement grade or location stakes lost or disturbed.

B. Install grade stakes and compare to indicated grades. If discrepancies are found between existing grades and grades indicated on Drawings, do not proceed until discrepancies are resolved.

3.2 ROUGH AND FINE GRADING

A. Rough grade area sufficiently high to require cutting by fine grading:

1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement.
2. Slope banks to required finish grades as cut progresses or leave cuts full and finish grade by mechanical equipment to provide grades and soil densities indicated on the Drawings.
3. Grade Only Areas: In areas not indicated to receive pavement, rough grade to approximate finish grades and then scarify, moisten and roll to obtain required density and indicated finish grades.
4. Tolerances: Finish grades shall be within a tolerance of 0.05 inch per foot above or below grades indicated. Provide an average grade as indicated.

B. Base or Subgrade:

1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement:
    a. After scarifying, process loosened material to a finely divided condition and adjust moisture content to optimum condition by addition of water, addition and blending of dry suitable material, or by drying of existing material.
    b. Subgrade material shall be compacted by tamping, sheepsfoot rollers or pneumatic tire rollers. Required relative compaction shall be [90] percent minimum for the top 6 inches below subgrade.
    c. Install base course in accordance with Section 31 2326 - Base Course.
2. Tolerance of completed grades of base or subgrade shall not vary more than 0.03 inch per foot from grades indicated. Provide an average grade as indicated.

3.3 SHORING

A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.

B. Design and Calculations: Provide in accordance with requirement CalOHSA.

C. Remove shoring upon completion of the Work of this section or when no longer needed unless required otherwise by authorities having jurisdiction.

3.4 EXCESS MATERIAL DISPOSAL

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.5 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION